

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

SUN RISES TO 'NET CHALLENGE



Scott McNealy outlines Sun's new Internet and intranet wares. Coverage of this and Java news, [page 124](#)

Net managers play point role in intranet migration

By John Cox

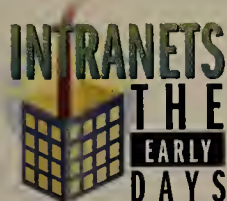
Even as you read this, somewhere in your company, someone, with no help from MIS, has in all likelihood just done something pretty astounding: He's made the cafeteria menu available to anyone with a Web browser.

Or maybe it's the corporate policy for buying PC equipment. Or notes from yesterday's managers' meeting. Whatever it may be, it's corporate information that

has never before been so easily accessible, all because of something called an intranet — an internal corporate network that uses Internet and World-Wide Web technologies.

It is this ability to easily publish all kinds of information and access it that is fueling the explosion of intranets in many companies. Most companies only experimenting

See Intranet, [page 124](#)



Turn to Intranets & the 'Net for the latest tips, tools and techniques; [page 59](#). The WANs & Internetworking section brings sense to telecommunications reform with a new feature: Carrier Services; [page 37](#).

Intranets & the 'Net

In-Site

Motorola's new life without routers



By Jim Duffy
Austin, Texas

Score one for the "death of the router" pundits.

Citing dissatisfaction with routers and its primary vendor, Motorola, Inc.'s semiconductor group is embarking on a massive and audacious project to replace up to 80 Cisco Systems, Inc. backbone routers with Cabletron Systems, Inc. switches. Motorola will replace 75% of the routers over the next three to five years at a cost of about \$10 million, and it may eventually discard all but remote-site routers.

Inadequate network performance and
See Motorola, [page 125](#)

Motorola's Rick Armstrong says his company had "bad luck with Cisco routers."

ANDREW YATES

Switching partners

IBM enlists ATM aid

Cascade to fill out high end of IBM WAN switching line.

By Michael Cooney and Tim Greene
Raleigh, N.C.

In what amounts to a reversal of IBM's ATM doctrine, the company last week turned to an outsider — Cascade Communications Corp. — to help fill out its switching line.

Cascade, a company that has developed a reputation for

See IBM, [page 124](#)

Get more info on Network World Fusion, including:

- ▶ Cascade B-STDX switch overview
- ▶ An analysis of IBM's ATM strategy

Select News+ then Front Page.



Digital adopts IP over ATM

By Jim Duffy
Las Vegas

Digital Equipment Corp. this week will announce a broad technology-sharing agreement with start-up Ipsilon Networks, Inc. intended to help Digital leap ahead of the switched internetworking pack.

Under the arrangement, which will be disclosed at NetWorld+Interop 96, Digital will license technology from Ipsilon that enables users to build networks combining the intelligence of IP routing with the power of Asynchronous Transfer Mode switch-

See Digital, [page 124](#)



More NetWorld+Interop coverage

Show highlights, [pages 6-14](#).

- ▶ Microsoft to explain TCP/IP snafu. [Page 6](#).
- ▶ MCI adds twist to SMDS. [Page 6](#).
- ▶ Pentium Pro servers debut. [Page 8](#).
- ▶ HP whips up Tornado management system. [Page 10](#).

Caution: IP hijackers are on the loose

By Ellen Messmer

Imagine waking up one day to find your Internet domain name has been taken away, leaving you and your business stranded on the information superhighway.

That is what recently happened to computer security expert Tsutomu Shimomura when a prankster cast him temporarily adrift in cyberspace. And, experts warn, it could happen to you.

It's called IP hijacking, and it can happen through sabotage or, more often, as the result of bungling by the name registration service managed by the Internet Network Information Center (InterNIC).

Other culprits are service providers that all too easily get the InterNIC to make unauthorized changes.

Most ominous, though, is sabotage by 'Net hackers who counterfeit electronic mail messages to the InterNIC — messages that make it seem that you authorized the name change yourself.

See IP hijackers, [page 123](#)

WHAT DO YOU DO IF YOU'RE HIJACKED?

If your organization's domain name gets taken away:

- ▶ Immediately contact your service provider to see if it or another ISP has mistakenly requested a change.
- ▶ Inform the InterNIC of the problem by both E-mail and phone.
- ▶ Launch an investigation. A disgruntled employee or cybercrooks skilled in counterfeiting routed mail could be the culprit.



Cabletron invades Bay turf

Rival readying switch module for Bay's System 5000 hub.

By Jodi Cohen
Las Vegas

Cabletron Systems, Inc. this week will launch an attack on Bay Networks, Inc. with the introduction of a high-end switching module for Bay's LattisSystem 5000 hub.

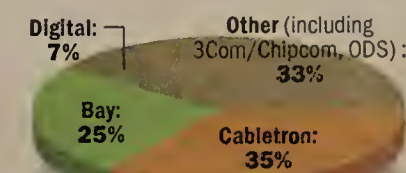
Cabletron confirmed it has tweaked its Ethernet and FDDI SmartSwitch module, designed for its Multi Media Access Center

See Cabletron, [page 125](#)

CABLETRON LAUNCHES BAY ATTACK

Cabletron hopes to infiltrate Bay's large installed base by offering its SmartSwitch module for use in Bay's System 5000 hub.

1995 worldwide modular hub port shipments:



Total ports shipped: 11,096

SOURCE: DELL'ORO GROUP, MENLO PARK, CALIF.

NEWSPAPER \$5.00

Access Network World Fusion using the number in yellow. See page 5 for details.

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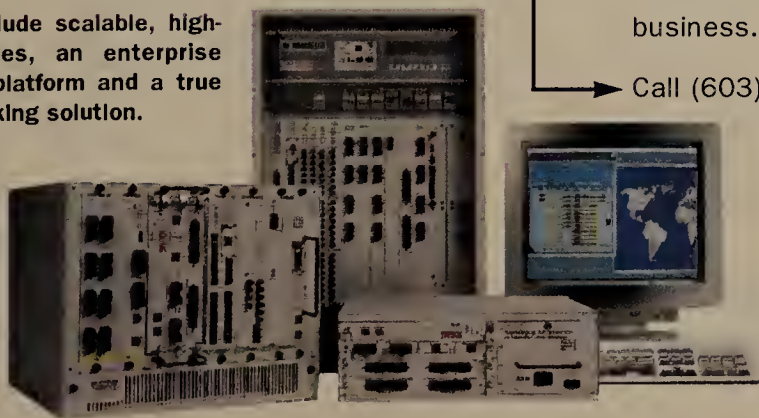
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FRAME RELAY IS NOT A RACE

BUT IF IT WERE, WE SEEM TO HAVE TAKEN THE LEAD

{//currentfile/Run/(Utilizing both Frame Relay and ATM technologies, mainstream companies will recoup the major investments made in existing network infrastructure.>Desh Deshpande)/

{//copy:>> Right now, nothing is bigger in WANs than Frame Relay. And right now, no one is bigger in WAN Frame Relay than Cascade. With more ports installed than any company in the world, Cascade has become the de facto leader.

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This Week



News+

(World+Interop)

A contingent of *Network World* reporters and editors will provide exclusive daily coverage of the show, from product announcements to keynotes to user reactions.

The Front Page:

Internetworking: Get an in-depth look at the technology behind Digital's and Ipsilon's switched internetworking strategies.

Intranets: We've created an entire page full of intranet resources, from our Web server buyer's guide to on-line conferences for people building intranets.

Internet: E-mail and address spoofing has been going on for years; bogus messages on April Fool's Day are an Internet tradition. Read articles on these and the newer threat of IP hijacking.

The Technical Sections:

On-line publishing: See how newspapers across the country are going on-line, and read analyses and critiques of their work, in Intranets & the 'Net.

Directories: Read articles on efforts by Novell and other vendors to turn their LAN directories into Internet services, in Local Networks.

Help desks: Download a buyer's guide to low-cost help desk software and look up answers to frequently asked help desk questions, in WANs & Internetworking.



Forum

Attending NetWorld+Interop? What do you think? What do you really like, and what do you hate. Talk about it in our N+I conference.

this week's pick

What does that thingamajig do? Look it up in Network General's Networking Glossary, at <http://www.ngc.com/networking/glossary.html>, which contains brief definitions for hundreds of networking devices, protocols and acronyms.

HOW TO GET ON TO NETWORK WORLD FUSION

At the welcome screen, click on First Visit and follow the instructions. Subscribers, keep your NWF number — highlighted on the front cover's mailing label — handy during registration. Non-subscribers must fill out an on-line registration form.



CONFERENCE PICK

HOT TOPIC

Mary Johnston Turner goes interactive.
Read her columns, then add your opinion.

Select Forum, Columnists then Network Convergence.

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NetworkWorld's Mission: To provide news and analysis that help network IS professionals deliver the network computing infrastructure and distributed applications required to meet evolving business needs.

DEBUT

**NetworkWorld
BROADBAND
TICKER**



A quarterly series that'll help you size up your broadband options. **Page 79.**

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Low-end hubs put up a fight for respect.

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NLMs that provide a NetWare server safety net. **Page 85.**



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NetWorld+Interop briefs, April 1, 1996

Here comes Exchange

Microsoft Corp. Chairman and Chief Executive Officer Bill Gates tomorrow will unveil the long-awaited and delayed Exchange Server, its enterprise messaging/integrated groupware product that shipped to distribution channels on March 23. Client access licenses cost \$54, based on 50 seats, and server licenses are priced at \$529, based on a three-server purchase. A Microsoft Mail/Exchange connector costs \$377, an Internet mail connector is \$377 and an X.400 connector is \$757. The Exchange Server Enterprise Edition, which includes the whole package, sells for \$1,970.

Separately, Lotus Development Corp. will announce the maintenance release for its Notes groupware. The new 4.1 version will feature additional platform support, including Windows NT on Digital Equipment Corp.'s Alpha.

IBM adding switch strength

IBM this week will introduce a 16-port token-ring switch, doubling the capacity of its existing device. The 8272 Nways Token-Ring LAN Switch Model 216 offers 16 fixed token-ring ports that support twisted-pair media and provides up to 384M bit/sec aggregate bandwidth. IBM will also add a 100Base-Fx Universal Feature Card to its 8271 Ethernet switch.

Security force

PSINet, Inc. intends to announce a comprehensive Internet security consulting, management, products and service package this week. Dubbed Secure Enterprise, the \$1,600-a-month offering pulls together multiple security components, beginning with extensive corporate policy planning.

Bay soups up System 5000

Bay Networks, Inc. this week will show off the 5380 and 5580 routing subsystems for its System 5000 switching hub. The 5380 and 5580 are Ethernet and token-ring modules, respectively, that each support four backplane interfaces and two expansion slots on the front panel for synchronous and ISDN WAN ports, or additional LAN interfaces. Each module routes 50,000 packet/sec, and as many as four modules can fit into the 5000 chassis. The 5380 and 5580 are priced from \$13,000 to \$23,000 and will be available in the second quarter.

RAD takes inverse route

RAD Data Communications, Inc. this week will announce an inverse multiplexer, dubbed the IMX-4T1, that allows customers to bond as many as four T-1 lines. The device gives customers a way to run broadband point-to-point links larger than a T-1 without having to buy a full T-3 connection. The device can handle Asynchronous Transfer Mode traffic and, in that application, would replace a data service unit/channel service unit. IMX-4T1 starts at \$6,500 and is available immediately.

Seagate has some NerveCenter

Seagate Software's Enterprise LAN Management Group this week will unveil a distributed management architecture for its Seagate NerveCenter product. The product will be extended to enable management over the Internet. Seagate will also announce its 32-bit Windows point product strategy based on the Seagate Frye Utilities for Networks product line.

It's a toss-up

If you're looking to pick up a couple of bucks in Las Vegas this week, drop by Enigma Logic, Inc.'s (ELI) booth No. 632 in the North Hall of the Las Vegas Convention Center. Rather than giving away Frisbees or other cliched vendor graft, ELI staffers will reportedly throw wads of several hundred dollars in cash into the crowd several times a day. Not all the logistical difficulties have been worked out, but if the company can get the bucks blowing smoothly from a giant fan, attendees will have an enriching experience.



Microsoft's Chairman and CEO Gates

MCI debuts 'toll-free' SMDS

By David Rohde

Las Vegas

MCI Communications Corp. this week will introduce a way for big corporations to establish secure, fast-packet interenterprise nets... with a toll-free flair.

At the NetWorld+Interop 96 show here, MCI will announce Toll-Free Addressing for its HyperStream Switched Multi-megabit Data Service. The idea is to take the concept of toll-free calling—really reverse billing—and apply it to the one broadband service that most closely approximates data dial tone.

As a connectionless cell relay service, SMDS differs from current implementations of Asynchronous Transfer Mode and frame relay in that it does not require preestablished permanent virtual circuits (PVC). SMDS has struggled to find a mass market, but analysts consider it optimized for interenterprise networking.

In fact, MCI is the only interexchange carrier (IXC) that offers SMDS. "MCI wants to con-

tinue to drive the market for SMDS for certain vertical [industries] when the companies don't want to use something insecure like the Internet," said Christine Heckart, senior broadband analyst for TeleChoice, Inc., a consulting firm in Verona, N.J.

HyperStream SMDS is usually billed on a simplex basis, meaning that two parties could be simultaneously communicating with each other but each pays for the usage it originates, explained Ray Kang, MCI's director of broadband marketing.

Under Toll-Free Addressing, the main company is charged for usage in both directions, while the partner company pays no usage charges, Kang said. The partner company still must obtain a local access line to the HyperStream network and a port on MCI's SMDS switch, he added, although the main firm could choose to reimburse this cost.

Other IXCs and their customers could try to design frame relay nets to mimic an interenterprise net that is, in effect, toll-free to a big company's distributors, suppliers or customers, Heckart said. "But some-

body has to pay for the PVC," she added. "You could agree to have one person pay for it one way and one the other way, but what if one person is using it 90% of the time?"

In addition, SMDS scales from 56K to 34M bit/sec, giving it a wider bandwidth range at the low end than ATM and a wider range at the high end than most frame relay offerings.

MCI is also the only IXC that offers usage-based pricing for all of its fast-packet services. This, and the ability to track SMDS data on a call-by-call basis, will also allow it to introduce here another SMDS option called Value-Added Addressing.

Under this plan, the partner companies are charged on a pay-per-call basis, meaning they pay for the usage in both directions, including usage originated by the main firm. ■

Bell Atlantic also
bucks up SMDS.
Page 38.

Microsoft tool kits mess up development of TCP/IP apps

By Kevin Fogarty
and Peggy Watt

San Jose, Calif.

Microsoft Corp., perhaps unwittingly, has been shipping developer tool kits that build applications that break when they run with non-Microsoft TCP/IP stacks, the company admitted last week.

The new problem has a familiar ring to Microsoft observers. Over the years, Microsoft has weathered a series of accusations that it has been underhanded in the way it competes, including charges that it uses undocumented calls in Windows to give its applications an edge. It also

had earlier problems with the TCP/IP stack in Windows 95 that made it difficult to install browsers that compete with Explorer.

Now an independent testing firm has confirmed that Microsoft has included proprietary calls in its Win32 developers' kit that are so badly documented that even Microsoft developers did not know they were there. As a result, Microsoft itself built applications that break when run with TCP/IP stacks from competitors.

The calls, which added new functions to WinSock's use of the TCP/IP stack in Windows 95 and Win-

See Microsoft, page 10



Stardust's Karen Milne says the proprietary calls were not the problem.

CORRECTIONS

Due to a printer's error, photos of IBM's John M. Thompson and Microsoft's Paul Maritz were swapped and ran with the wrong stories on March 25. The IBM story should have had a photo of John W. Thompson, general manager of IBM's Personal Software Division.

Clarification:

A front-page article on March 25 stated that Compaq Computer Corp. will add the ability to use Insight Manager remotely. The software already can be used to manage Compaq servers, but the company will add remote management of its switches and hubs, and other vendors' net devices.

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Pentium Pro: Is it just too much too soon?

By Ben Heskett

Las Vegas

There will be a lot of Pentium Pro (P6) chip talk at NetWorld+Interop 96 this week.

IBM and Digital Equipment Corp. will showcase servers based on the new microprocessor, and others, such as Hewlett-Packard Co., will discuss their plans.

Despite the expected trade show bustle over the chip, a creeping malaise has come over some Intel Corp.-based server vendors — including Compaq Computer Corp. and Dell Computer Corp. — which see a powerful chip on a slow ramp to success.

When Intel announced the P6 last fall, the firm hyped the chip as best suited for servers and stressed the fact that it closed the performance gap between Reduced Instruction Set Computing chips and Intel-based microprocessors when running mission-critical applications.

The current ambivalence over the chip is tied to the principal software expected to take advantage of its advancements: Windows NT. Many customers remain in the pilot stages with the network operating system, so they do not need to invest in P6 servers yet, according to analysts.

Executives at Compaq and Dell echoed those sentiments.

"You won't see volume shipments of Pentium Pro servers until late '96, early 1997," said Gene Austin, Compaq's vice president of marketing.

Dell, which already debuted P6-based desktops, will not rush its P6 servers due to its belief that customers are not in need of the increased performance, said Scott Weinbrandt, Dell's direc-

tor of server marketing.

Dell and others, such as Tricord Systems, Inc., NetFrame Systems, Inc., Data General Corp. and AST Research, Inc., will wait until the second half of the year to offer their P6 servers.

Pentium Pro server parade

Already announced:

- **Advanced Logic Research** — Revolution Quad6
- **NEC Technologies** — ProSera line
- **IBM** — 704 server

On the way:

- **Servers from AST Research, Compaq, Dell, Digital and HP**

"The server market is a conservative one, the Pentium Pro [chip] pricing is on the high side, and many of these [administrators] still aren't doing Windows NT," noted Nathan Brookwood, an analyst at Dataquest, Inc., a consultancy in San Jose, Calif.

The chip features twice the throughput of the Pentium in some configurations and is optimized for 32-bit applications, which developers are writing at a furious pace, according to analysts. As a consequence, when administrators embrace NT 4.0 — the next release — and its corresponding applications, a similar love affair will begin with the P6 chip, they said.

Interviews with several customers indicate some have the expense accounts to immediately fiddle with P6 server technology, but many cannot cost-justify a P6 purchase with smooth-running servers already in place.

"I am hesitant on going to any first version of an operating system or a new processor," said Eric Gasior, a net administrator for the National Aeronautics and Space Administration Goddard Space Flight Center in Greenbelt, Md. He recently bought a Compaq Pentium-based ProLiant server. "Basically, we figured the Pentium was good enough," and money was saved in the process, said Gasior, who opted to expand his server memory instead of increasing his processing speed. ■

Pentium Pro: A slow starter?

According to market research firm Dataquest, shipments of Intel's Pentium Pro chips will be less brisk than those of the original Pentium processor during its first three years.

Pentium shipments (in units):

1993 (starting in April):	325,000
1994:	5 million
1995:	32 million

Pentium Pro shipments/
projected shipments (in units):

1995 (starting in November):	100,000
1996:	2.5 million
1997:	20 million

Mitel, Madge to marry voice and data

By David Rohde

Las Vegas

PBX maker Mitel Corp. is joining with switching hub vendor Madge Networks, Inc. this week at NetWorld+Interop 96 to introduce a way to ship voice and data traffic across a single campus network.

Mitel's Networked Voice and Data (NeVaDa) architecture is designed to let companies use a single private branch exchange to distribute calls to other buildings over a converged voice/data net anchored by Madge hubs, said Dan MacDonald, Mitel's product marketing manager for enterprise networking.

The network architecture involves linking a call control module in Mitel's high-end PBX with one or more of Madge's MultiNet Ethernet switching hubs across a fiber backbone.

Key to NeVaDa is a new Asynchronous Transfer Mode/Synchronous Optical Network (SONET) module, called the LBT-155, which was jointly developed by Mitel and Madge. Installed in each Madge hub, it cuts a 16M bit/sec swath out of a 155M bit/sec fiber stream between buildings to provide a priority path for voice traffic, explained John Freeman, senior

consultant for Decisys, Inc., a Sterling, Va., consultancy.

Based in Kanata, Ontario, Mitel holds the No. 5 position in U.S. PBX market share. The company is trying to stand out by focusing on computer-telephone integration (CTI).

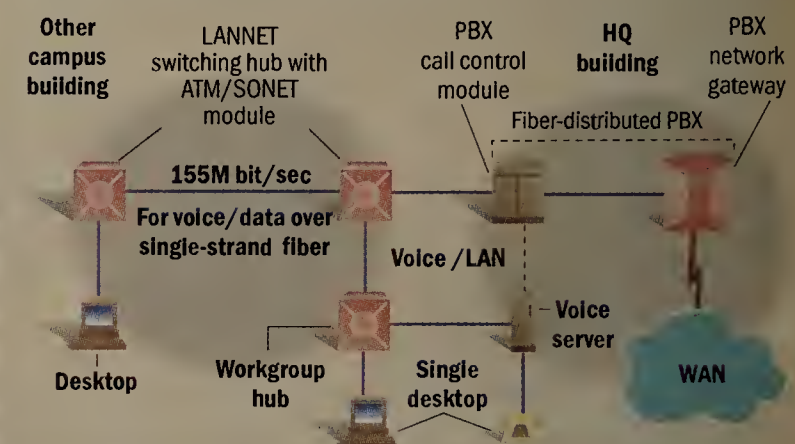
Officials hope NeVaDa will showcase CTI going beyond its classic application of screen pops, in which an API translates telephony events into PC commands to synchronize the arrival of a telephone call with the arrival of data about that caller on a user's desktop.

But to achieve such a goal requires a fair amount of network horsepower. First, users must purchase Mitel's SX 2000 Light voice switch, which the company dubs a fiber-distributed PBX because its functional parts are split up along a fiber backbone. Then users must install the LBT-155 ATM/SONET module in each Madge hub running along the multi-building backbone.

Conventional workgroup hubs can then come off the backbone — for example, on separate floors of the main building

Mitel's NeVaDa architecture

Under the architecture, a Mitel fiber-distributed PBX routes calls among buildings. It also links to Madge's LANNET switching hubs to concentrate data and voice traffic on a 155M bit/sec backbone.



3Com to unveil Fast Ethernet gear

By Jodi Cohen

Las Vegas

3Com Corp. this week will roll out a Fast Ethernet hub designed for networks still using older cabling.

LinkBuilder FMS 100 is a 12-port 100Base-T4 that offers an optional fiber or copper port to interconnect with another hub or switch.

The hub can be stacked up to eight high and managed as a single unit.

Unlike most Fast Ethernet devices that require expensive Category 5 unshielded twisted-pair cabling, 100Base-T4 can run on existing Category 3, 4 or 5 wire.

Fourth-quarter sales showed 3Com's market share is now roughly three times larger than that of the next closest competitor in the 100M bit/sec Ethernet hub market, according to the Dell'Oro Group, a consultancy in Menlo Park, Calif.

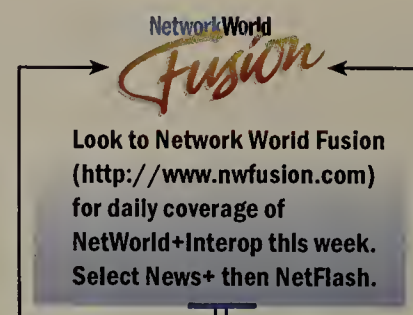
Pricing for the hub starts at \$199 per port and will ship in June.

Along with the new hub,

3Com unveiled its Fast EtherLink 10/100Base-T4 PCI adapter card.

The new card provides auto-sensing between 10M and 100M bit/sec connections and bus mastering.

The card sells for \$159 and is available now.



3Com also will display at the show its AccessBuilder 7000, a 16-slot chassis that supports multiple analog, ISDN and WAN modules for LAN-to-LAN connectivity.

The device is designed to make it easier to build secure intranets and remote access networks, and is targeted at Internet service providers.

©3Com: (408) 764-5000.

— to move LAN traffic to desktop PCs (see graphic).

Freeman cautioned users that the Mitel design of a segregated voice path along the multi-building backbone is not a standard voice-over-data network protocol. "But until you get a standardized way of prioritizing [ATM] voice cells, you've got to come up with a proprietary solution," he said.

Users also will have to weigh the potential benefit of eliminating duplication among voice and data infrastructures and their separate staffs against the cost of an ATM/SONET implementation, Freeman added.

To help this process, Mitel also claims an important side benefit with NeVaDa that is one of the PBX world's Holy Grails: the ability to manage the PBX on a Simple Network Management Protocol-based network management application. NeVaDa installations will include software running on Hewlett-Packard Co.'s OpenView to manage voice elements, according to MacDonald.

Field trials of NeVaDa will begin in June, with availability slated for early fall.

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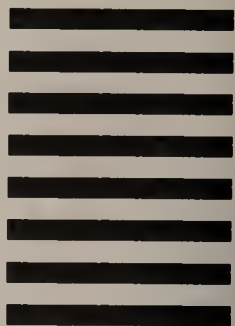
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Bay Networks

Observers expect Tornado will become a mere squall

By Jim Duffy
Las Vegas

A tornado watch will be in effect for NetWorld+Interop 96 this week.

After a year delay, Hewlett-Packard Co. will unleash the distributed Tornado version of its OpenView management platform and announce the product is ready to ship (NW, Jan. 23, 1995, page 1).

But observers said Tornado may be more of a hair-tousling gust than a house-flattening funnel cloud. "From what I've heard, it sounds like it's still an incremental step rather than a major leap," said Rick Sturm, a member of the technical staff at US WEST Communications, Inc. in Boulder, Colo.

Tornado distributes OpenView management functionality, such as device discovery, polling and event filtering, across servers in the network and out closer to managed devices, HP said. By spreading these functions out, problems can be resolved more quickly and management can scale with the size of the net.

Distributed Tornado servers governing single domains can

exchange event and topology data, and send it up to a centralized enterprise management console, HP said. This peer-to-peer communication should enable servers to cooperatively manage multiple net domains.

Additionally, after Tornado servers discover their domains and pass all that information up to the enterprise console, they then only pass configuration or status change information to the central console, sources said. This alleviates the central console from having to rediscover the whole network when changes occur, which can use up a lot of WAN bandwidth.

OpenView today is a centralized management system that consumes a lot of bandwidth and is limited in scalability. Enterprise management is restricted by the horsepower of that console and the consumption of WAN bandwidth.

But analysts are still not blown away by Tornado. "It seems most easily configured to do hierarchical management" rather than peer-to-peer management, said Sylvia Clark, a senior analyst with Aberdeen Group, Inc. ■

Stardust

Continued from page 6

dows NT, were no problem, said Karen Milne, president of Stardust Technologies, Inc., an independent WinSock testing firm.

The problem was that Microsoft never documented which calls were standard WinSock functions and which were proprietary requests that worked only with Microsoft TCP/IP stacks.

Microsoft developers were caught in the same trap as outside firms, Milne said. Both the PowerPoint 7 presentation software and the Internet Explorer World-Wide Web browser are written using the proprietary calls, meaning they hang or crash when using any TCP/IP stack other than that in Windows 95.

Microsoft did nothing wrong in creating the calls, most of which will show up in WinSock Version 2, which is due later this year, said Alec Saunders, product manager for Microsoft's desktop and business systems division.

Microsoft has been working on documentation and technical fixes since January, he said.

When word of the proprietary calls threatened to hit the streets,

however, Microsoft moved fast.

The firm pressured Stardust to cancel a press release it planned for last week that detailed the problem and called for an emergency meeting on the subject at the NetWorld+Interop trade show in Las Vegas this week, Stardust officials said.

The meeting will still happen at 6 p.m. Tuesday, April 2 in Room 238 of the Las Vegas Convention Center.

Microsoft's competitors in the TCP/IP space, meanwhile, are livid. "Microsoft has taken an open standard and turned it into a proprietary Microsoft implementation; that's a major concern," said Craig Schmidt, director of market development for WRQ, Inc., a TCP/IP developer in Seattle.

This incident echoes the Internet imbroglio last October when Web browsers from CompuServe, Inc. and Spry Communications Corp. were tripped up by the Windows 95 TCP/IP stack, said Bob Williams, vice president of business development at NetManage, Inc. in Cupertino, Calif. Independent software vendors had to alter their software to use the Windows 95 TCP/IP stack. ■

Shiva has new switch for remote access

By Tim Greene
Las Vegas

Shiva Corp. this week at NetWorld+Interop will announce a single box that has all it takes to support ISDN or analog phone access to corporate LANs and the Internet.

LanRover Access Switch eliminates the need for stand-alone data service units (DSU) and modem pools.

The switch also reduces the number of wide-area lines com-

and modem pools. It is also easier to manage a single device, he noted.

The switch chassis has 11 slots, with one reserved for the CPU and one for an Ethernet connection. The rest can be filled with either two-port T-1/PRI ISDN cards or digital modem cards that each contain 12 V.34 modems.

In a typical configuration, a remote user would dial a single phone number for access to a

The switch comes with Shiva Remote client software, which supports Windows, Unix and OS/2 operating systems, as well as PPP, SLIP, IPX, TCP/IP and NETBEUI protocols.

To address the security concerns that come with remote access, the switch comes with Shiva's own Net Manager User List Server. But it supports other security methods, as well. Those include dial-back, Challenge Handshake Authentication Protocol and Password Authentication Protocol.

The switch also has several management platform options. It supports Shiva's Windows-based management system, Shiva NetManager, and a new Unix-based version of Shiva NetManager.

They offer real-time monitoring of usage, which can be used for network planning and billing.

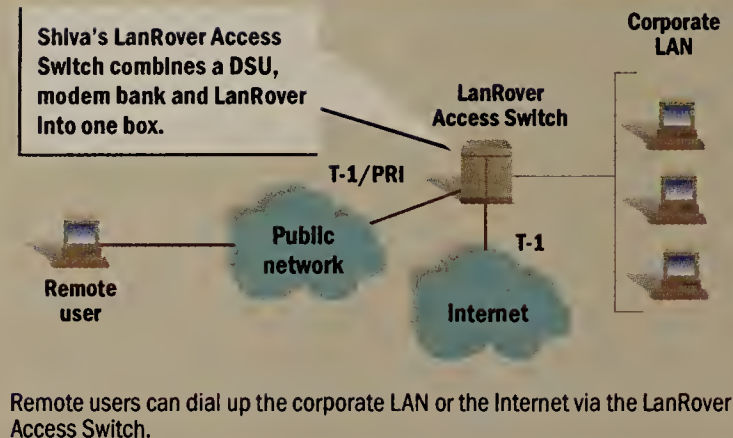
The device minimizes dial-up costs by breaking the connection when the remote user is not actively sending and receiving data, and automatically reconnecting when the line is needed.

Developed in conjunction with Northern Telecom, Inc., the switch is being marketed to carriers and Internet service providers by Nortel as the Rapport Dialup Switch.

Later this year, Shiva will release Fast Ethernet, frame relay and Asynchronous Transfer Mode cards.

©Shiva: (617) 270-8300.

Dial-up access with less clutter



ing into the central site by aggregating individual analog calls and ISDN Basic Rate Interface calls onto 1.55M bit/sec T-1/Primary Rate Interface ISDN lines.

Russ Lane, network integrator for American Express Financial Advisers in Minneapolis, said the device would let him get rid of four cabinets of Shiva LanRover access boxes, all the wiring between them, and the DSUs

T-1/PRI port on the switch. If the call was from an analog phone, it would be switched to one of the V.34 modems. If it was an ISDN call, it would be switched directly from the T-1/PRI card. It also lets central-site users dial out.

In other configurations, the switch could connect two LANs over a dedicated T-1 or connect LAN and remote users to the Internet over a dedicated T-1.

Xylan makes late PizzaSwitch delivery

By Jodi Cohen
Las Vegas

Xylan Corp. this week will finally take its PizzaSwitch out of the oven and serve it up to customers looking for a taste of Ethernet switching.

The store-and-forward switch features 12 switched Ethernet ports and a choice of up to two Fast Ethernet, FDDI or Asynchronous Transfer Mode high-speed backbone links. PizzaSwitch boasts a forwarding rate of 14,880 packet/sec and supports as many as 2,000 media access control addresses.

The device, which will be on display here at NetWorld+Interop 96, is designed for small workgroups and serves as a little brother to Xylan's OmniSwitch nine-slot switching hub.

Xylan announced its intention to roll out the PizzaSwitch at the fall NetWorld+Interop show

in 1994. At that time, the company expected to ship the product during the first quarter of 1995, followed by the OmniSwitch box. But the company

reversed its plans and put the PizzaSwitch on the back burner when customers demanded the high-end modular OmniSwitch first, analysts said.

"There was a lot more need for a high-end switch like the OmniSwitch early on rather than a smaller configuration [PizzaSwitch] box," said

Esmerelda Silva, an analyst at International Data Corp., a consultancy in Framingham, Mass. "The delayed rollout is just a reflection of what happened in the market."

While the PizzaSwitch seems

like a workgroup device, Silva said it actually offers many high-end features, including integrated routing capabilities.

"Xylan's PizzaSwitch has features that you typically don't find in switches from the leading inter-networking vendors," she said. "For example, it has IP and IPX routing support."

Other PizzaSwitch features include policy-based virtual LANs, Remote Monitoring and ATM LAN Emulation support. John Mazzaferro, Xylan's director

of corporate marketing, said the switch will compete with similar products from Agile Networks, Inc. and Bay Networks, Inc.

PizzaSwitch is available now starting at \$5,000.

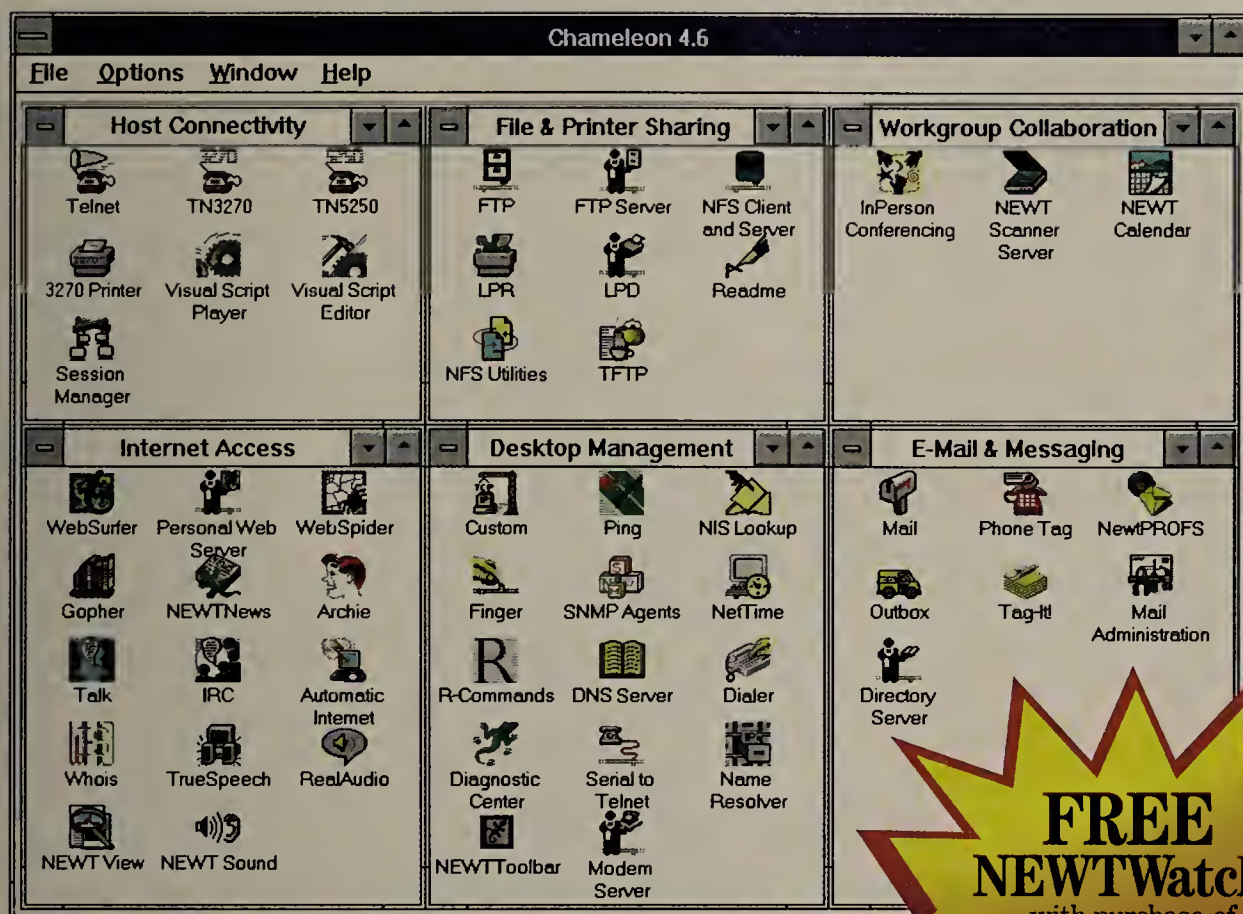
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Xylan's Mazzaferro says the switch will compete with Agile and Bay offerings.

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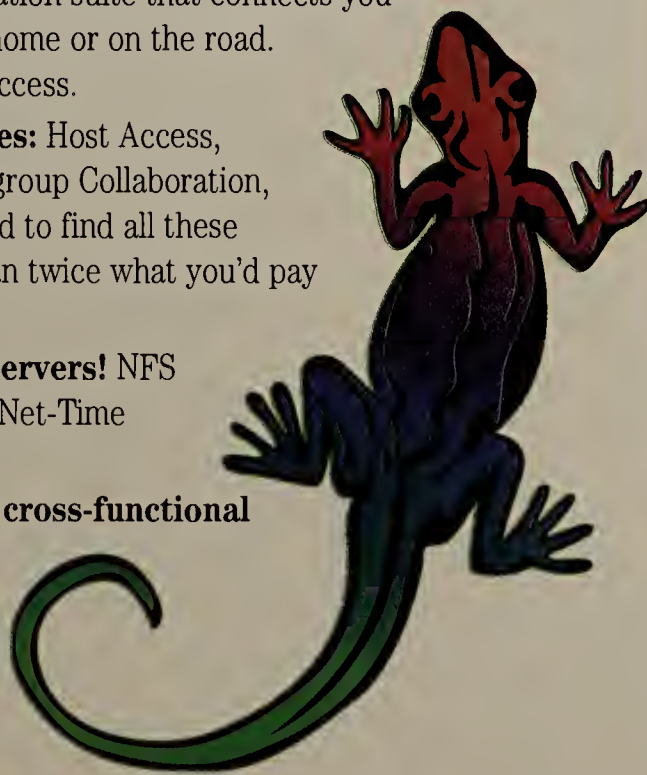
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BBN Planet to become center for electronic commerce

By Joanie Wexler
Las Vegas

Internet services company BBN Planet will reveal at NetWorld+Interop 96 here

this week plans to become a full-blown electronic commerce services provider.

The company is striking partnerships with software developers to build a suite of

electronic commerce services it will host in its backbone, according to David Toub, BBN Planet's vice president of application services.

The idea is to provide customers, suppliers, shippers and financial organizations with standard electronic data interchange procedures, directory services, collaboration capabilities, secured documents, digital signatures and other commerce-oriented functions. Service

components that speak to those tasks will be in place in the BBN network by the end of the second quarter, Toub said.

The suite will be accessible worldwide come June, thanks to a connectivity deal — announced last week — BBN Planet struck with global networking company Scitor to extend the company's reach into other countries.

At the show, BBN will showcase some of the technology. It will team with conferencing software maker Intel Corp. and router vendor Cisco Systems, Inc. to demonstrate a multicast video application for Web sites. This would allow a user browsing a commerce site to initiate a live video-conferencing session with a customer service representative for more information.

Other service components, such as a bandwidth reservation service for conferencing sessions — code-named

QOS and based on the Resource Reservation Protocol (RSVP) — will be announced this week, Toub said.

The services suite is an alternative to users integrating the components themselves, dealing with multiple vendors and continually changing out technologies as they are upgraded or new ones arrive. Still, there will always be companies that prefer to hold the strings.

"We are probably big enough that we would elect to handle the technology in-house," said Jon Castle, senior engineer at Commonwealth Edison in Chicago. "I've always had trouble trusting a [third party], in terms of security, such as how they're handling the firewall."

In general, though, "people look to their ISP first when planning a 'Net or commerce strategy," said Steve Franco, senior analyst at The Yankee Group, a consulting firm in Boston. "Most are looking to reduce their number of suppliers," rather than adding 15 or 20 to support new commerce initiatives, he said.

For transaction processing services, BBN will likely compete with its partner AT&T, which resells BBN's dedicated Internet connectivity services. For some of the other services that will eventually find their way into AT&T's commerce offerings — which run on AT&T's own networks as well as the 'Net — the two companies might compete, cooperate or resell each other's services, Toub said.

And the new Scitor partnership allows BBN to extend its 'Net services to Scitor's 160 points of presence across the Atlantic, said Mark Lunardon, BBN Planet's international service line manager. ■

COMMENTS?

See "How to reach us" on page 6.

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Ameritech makes renewed ATM push

By Tim Greene
Chicago

Ameritech Corp. last week announced a comprehensive set of ATM services designed to bring the versatile technology to the masses.

In doing so, the carrier gets an early lead on other regional Bell operating companies expected to make similar offerings this year.

The Ameritech offering has three main features:

■ **A 1.5M bit/sec T-1 speed option.** This size pipe should attract more customers to try Asynchronous Transfer Mode. Ameritech has been offering ATM since last year at OC-3, T-3 and T-1, but the T-1 option has been made available only at the customer's request.

■ **Frame relay-to-ATM service interworking.** This allows customers to leave their frame relay links in place while feeding larger sites via ATM. The translation between frames and cells takes place within the Ameritech network.

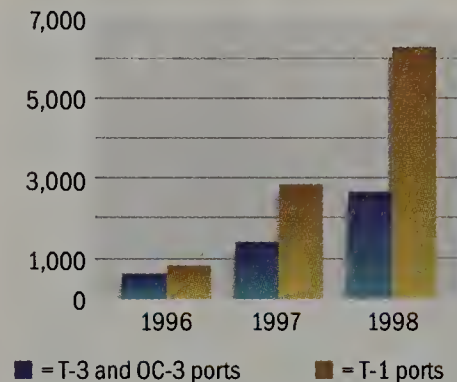
■ **ATM provisioning.** This includes LAN switches as well as monitoring and managing a customer's ATM network.

"This is the leading-edge effort" among RBOCs, according to Thomas

Nolle, president of CIMI Corp., a technology assessment firm in Voorhees, N.J. Most users have no need for T-3 or OC-3 service, so T-1 is more in tune with their bandwidth needs and their pocketbooks, he said.

Low-speed ATM boom coming

ATM port shipment projections for the U.S.



SOURCE: VERTICAL SYSTEMS GROUP, DEDHAM, MASS.

Other local exchange carriers are expected to follow suit later this year with lower speed ATM packaged with hardware and service support, according to Steve Sazegari, principal with Tele.Mac, a

telecommunications market research firm in Foster City, Calif. "That's where the market will be. Wider bandwidths were not selling," he said.

Phillip Skinner, telecommunications director for Ohio State University Medical Center in Columbus, said ATM met his needs for a single network that could run clinical information data, video for teleconferencing and radiology imaging among seven hospitals. Without ATM, he would need three separate nets, but he needed only T-1 bandwidth.

In addition, he wanted to have a managed service that would relieve his staff from having to travel up to 100 miles to respond to network problems.

The service interworking will allow him to connect 25 frame relay links in his network to the hospitals' ATM backbone.

The ATM services will be offered generally in eight cities in the Ameritech region starting in June.

Ameritech said all pricing is on an individual case basis. Skinner said his seven T-1 ATM lines would have cost \$11,000 per month were it not for a contract Ohio has for expanding its data networks. Those lines cost \$3,000 per month under that program, he said. ■

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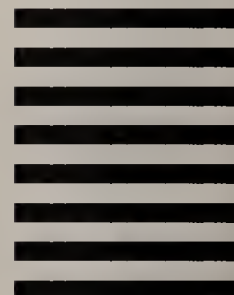
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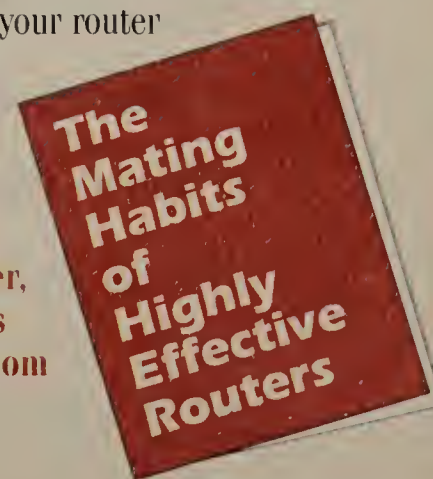
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Briefs

■ **Penril Datability Networks** will announce at NetWorld+Interop 96 a **remote access server** that integrates eight, 16 or 24 V.35 modems in a five-inch chassis. Targeted at corporate network central sites, RAM Rack costs \$6,495 for eight ports and \$11,495 for 16 ports. Penril: (800) 473-6745.

■ At NetWorld+Interop 96 this week, **Trancell Systems, Inc.** will introduce WebRamp, an **Internet access device** for remote offices that combines the features of a hub, router and IP gateway for IPX traffic. It comes in five models: two that include hubs with eight 10Base-T ports, one with one 10Base-T port and two that work with existing hubs. Each has an ISDN Basic Rate Interface port and includes an ISDN terminal adapter. Two models include the IP to IPX gateway. Prices range from less than \$500 to about \$1,000. Trancell: (408) 988-6363.

■ **AirSoft, Inc.** has announced a new version of its **remote node data acceleration** software that supports Windows 95. Version 2.0 of Powerburst also includes a so-called native agent implementation that operates as a Windows NT service on NT servers or as a NetWare Loadable Module for Novell, Inc. NetWare file servers. This reduces the amount of remote traffic being serviced by the file server. Powerburst 2.0 is available now. A client license costs from \$49 to \$129, and the agent costs \$995 for support of up to 64 simultaneous clients. AirSoft: (800) 708-4247.

■ **Linmor Information Systems Management, Inc.** rolled out a new version of its **management framework software** that supports more workstation platforms. Version 2.1 of Nebula Integrated Control Center features a data repository that runs under SunOS 4.1.X, agents and administration tools that run under Digital Equipment Corp. Unix. The release costs \$44,725 and is shipping now. Linmor: (613) 820-4066.

IBM's APPN/HPR product family

Product	End node	Network node	DLUR/DLUS	HPR
2210	NA	✓	Q1 1997	Future
AS/400	✓	✓	Q4 1996	✓
C/S2	✓	✓	✓	✓
VTAM/NCP	✓	✓	✓	✓
2217	✓	✓	✓	4/96
3172	NA	✓	✓	6/96
3174	✓	✓	✓	✓
3746	NA	✓	✓	Q4 96
6611	NA	✓	✓	✓

✓ = Available, NA = Not available

SOURCE: IBM

IBM finally adds HPR to key communications tools

Company looks to boost its SNA product line through HPR.

By Michael Cooney
Raleigh, N.C.

The wait is over—sort of.

IBM last week announced most of the final cogs in its High Performance Routing (HPR) puzzle by adding the technology to a range of communications products.

HPR is one of the key technologies that will help drive SNA user migration to Advanced Peer-to-Peer Networking and future high-speed networks. The technology is an extension of APPN and adds a number of improvements, including congestion control and failure redundancy.

"With HPR, SNA users can improve the performance, increase availability and reduce the overall costs of building large enterprise networks," said Wendy Arnette, HPR program manager for IBM. "Plus, it can position SNA users to move into ATM in the future."

ATM and APPN grow closer

With regards to Asynchronous Transfer Mode and APPN, the APPN Implementers Workshop (AIW) met last week to give the proposed APPN/ATM interworking specification second-level approval. AIW specifications need three levels of approval before vendors can safely begin integrating the technology into their products.

APPN/ATM interworking describes how vendors could map HPR class-of-service routing directly to ATM's quality of

service specifications. This means that APPN/HPR users can utilize APPN's class of service, which defines route security, transmission priority and bandwidth between session partners across an ATM net.

See IBM, page 36

Net mgmt. vendors look to enhance help desks

By Jim Duffy

Three network management vendors have unveiled upgraded products to increase the capability of corporate help desk systems.

Astea International, Inc., Cambio Networks, Inc. — formerly known as ISICAD, Inc. — and Peregrine Systems, Inc. have all unwrapped new versions of their management software packages that provide greater visibility into enterprise nets.

Astea and Peregrine have extended their help desk offerings. Meanwhile, Cambio enhanced its WAN management offering that integrates with help desk packages.

Astea announced PowerHelp 2.2, a new release of its client/server help desk and customer service software that includes World-Wide Web features, electronic mail access to

databases, integration with leading network management packages, and improved data search and retrieval capabilities.

The Web capability includes a Web server that lets users access PowerHelp information. *See Help desk, page 32*



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Larscom adds ATM to its Orion 4000 mux

By Tim Greene
Las Vegas

Larscom, Inc. this week introduced two Asynchronous Transfer Mode modules for its Orion 4000 multiplexing platform to let users aggregate a variety of traffic onto large ATM links.

In addition to these NetWorld+Interop 96 announcements, Larscom will introduce the EtherSpan Ethernet bridge. This product was announced last year as EtherBridge but has been reworked and renamed.

The addition of the ATM modules fulfills Larscom's plan to offer users a way to employ ATM in the wide area without

scrapping their investment in the Orion multiplexing platform. Until now, the Orion 4000 did not handle ATM traffic. Other ATM modules are planned.

The modules offer net managers who already have an Orion 4000 the option of adding ATM at minimal cost. Because it is modular and relatively inexpensive, the Orion approach provides more flexibility, according to Jim Wilson, consulting engineer for the Ohio Bureau of Workers Compensation (OBWC).

Wilson said the OBWC network has an Orion 4000 with one

wide-area link that could be a candidate for ATM. "If we get more demand, we could try it and just drop a module into the same chassis," he said.

The modular platform can function as a multiplexer, aggregating traffic onto a single link, as well as an inverse multiplexer, aggregating traffic onto several smaller links to give the equivalent of a single, large pipe.

In concert with other Orion modules, the ATM Network Core Module (NCM) and the ATM Data Terminal Equipment Core Module (DCM) let users connect ATM LANs using multiple T-1 private lines. That means users can meet high-bandwidth needs in the wide area without buying a full T-3 line.

The NCM module features a single 155M bit/sec OC-3c port that can connect to either a public ATM service or an enterprise ATM switch. It can receive traffic directly through two high-speed serial interface ports with a total capacity of 15M bit/sec. But it also can receive traffic through

See Larscom, page 32

Larscom plots ATM over TDM plan



Larscom's new Orion 4000 ATM modules allow users to connect high-bandwidth ATM LANs over leased T-1 lines.

INTERNETWORKING MONITOR

Scott Bradner



They doth protest too much, methinks

There is something I don't understand about the V-Chip and, by extension, Internet content rating systems such as PICS. To be more specific, I don't quite get some of the reaction.

For the cave dwellers among us, the V-Chip is the "blocking technology" (in

the words of the statute) mandated by the new telecommunications act for inclusion in all "apparatus designed to receive television signals."

Some people are suggesting similar technology for the Internet, the use of which might also be mandated by future legislation.

The V-Chip requirement is to start within a few years (no less than two years, but the exact timing is up to the FCC) and will mean that all TV sets with a picture size of 13 or more inches sold or manufactured in the U.S. must include the ability to block programs with a rating that exceeds some customer-set threshold.

The idea here is to give an actual enforcement tool to add to a parent's admonition to their child to not watch "that" kind of show. Adults could also use it to protect themselves from channel surfing across a show they would rather not see.

This law is causing a great deal of whining and gnashing of teeth from the direction of Hollywood. It will be the end of civilization as we know it (as if one can speak of civilization and Hollywood or its products in the same paragraph). No one, the claim is, will be willing to produce shows that might be blocked because there would be a bad connotation. And even if they did, advertisers would not buy time on these shows and so the stations would not run them. Thus, we are implementing government censorship.

This does not jive with history or even a perfunctory analysis.

Hollywood has played the ratings game before. Today, most movies shown in the U.S. have an MPAA rating, but this was not always the case. Back in the early part of the century, Hollywood films got progressively more risqué until a backlash in public opinion — or at least political opinion — caused a very strict set of guidelines to be instituted. Hollywood was freed of these guidelines when the MPAA ratings were adopted. Hollywood now had a way they could justify risqué films because the ratings would prevent children from seeing what they should not be seeing.

But from observation, it seems Hollywood feels little inhibition in making just about any kind of film they feel like.

Why wouldn't this also happen with the V-Chip? In a few years, the makers of TV shows will be able to argue that they are free to make and broadcast just about any sort of show because all the new TVs can be programmed to protect kids and sensitive adults. And, they'll add, TVs are cheap enough that any parent wanting to protect their kid can go get a new one.

The American public has generally demonstrated that they are less rejecting than some of the politicians in what they will watch. (Some will even watch the politicians, for example.)

If the audience is watching, the advertisers will be there, as well. You might not get the same advertisers, but even people tuning in for titillation are consumers, and there will be many companies wanting their business.

So I don't understand Hollywood's lament. Seems to me a bit like Brer Rabbit pleading with Brer Bear not to throw him into the briar patch.

Disclaimer: Harvard always rates at the top (always in its own mind, often others agree), but the above are my observations, not Harvard's.

Bradner is a consultant with Harvard University's Office of Information Technology. He can be reached via the Internet at sob@harvard.edu.

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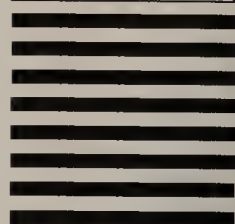


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Technically Elite brings network monitoring down to domain level

By Jim Duffy

Campbell, Calif.

Technically Elite, Inc. last week extended its line of network analysis tools with a domain-level monitor designed to distribute management intelligence throughout the network.

Called DomainMeter 7000, the device allows administrators to monitor large, complex networks by dividing them into manageable domains. These can then be individually surveyed or administered from a centralized console.

DomainMeter 7000 is a Unix-based server running a 32-bit 75-MHz Intel Corp. Pentium processor with 16M bytes of RAM, 256K bytes of cache memory and 850M bytes of disk space. It sports a single

The device also features a rules-based expert system that can automate problem diagnosis and resolution.

DomainMeter 7000 costs \$6,995. It is available now.

Technically Elite was founded in October 1995 following last year's merger of Network Application Technology and Technically Elite Concepts, Inc. The company's chairman and chief executive officer is David Norman, who founded Dataquest and the \$1 billion computer retailer Businessland, Inc.

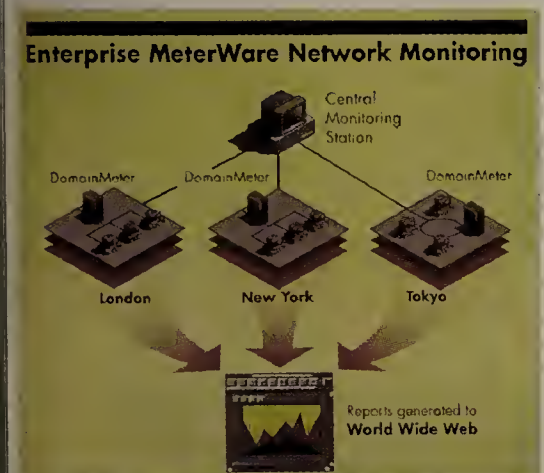
Norman said he was attracted to Technically Elite because of the company's exclusive focus on the network monitor-

ing market and that market's potential.

There are several requests for proposal from large companies already on the table for enterprisewide network monitoring, he said.

Moreover, market tracker International Data Corp. of Framingham, Mass., projects that the remote monitoring market will reach \$2.4 billion in the year 2000, from about \$744 million in 1996.

©Technically Elite: (800) 474-7888.



DomainMeter distributes polling and data collection.

10Base-T Ethernet interface, two RS-232 asynchronous ports and a single parallel port.

DomainMeter 7000 works with a software application called MeterWare for Unix 2.2 DomainServer. MeterWare allows the system to poll and collect information from network domains, correlate it and report it to a centralized monitoring console, such as Technically Elite's own MeterWare station, or to a leading Simple Network Management Protocol platform such as Hewlett-Packard Co.'s OpenView. DomainMeter 7000 is intended to off-load the main management console from the overhead associated with polling numerous probes.

DomainMeter 7000 supports the Remote Monitoring Management Information Base for standards-based data collection. It can capture packets and perform seven-layer protocol decodes, and generate reports accessible through the World-Wide Web. Using a Web browser, users can view network utilization, source and destination summaries, protocol, traffic and error summaries, and packet information.

"The one thing that I thought was really intriguing about this is that they're using Web technology to provide the management information," said Trudy Barker, an analyst at Dataquest, Inc. in San Jose, Calif. "I have heard from several other vendors that that is a direction for the future, and it looks like [Technically Elite] is actually doing it now."



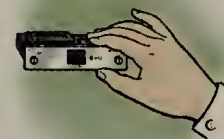
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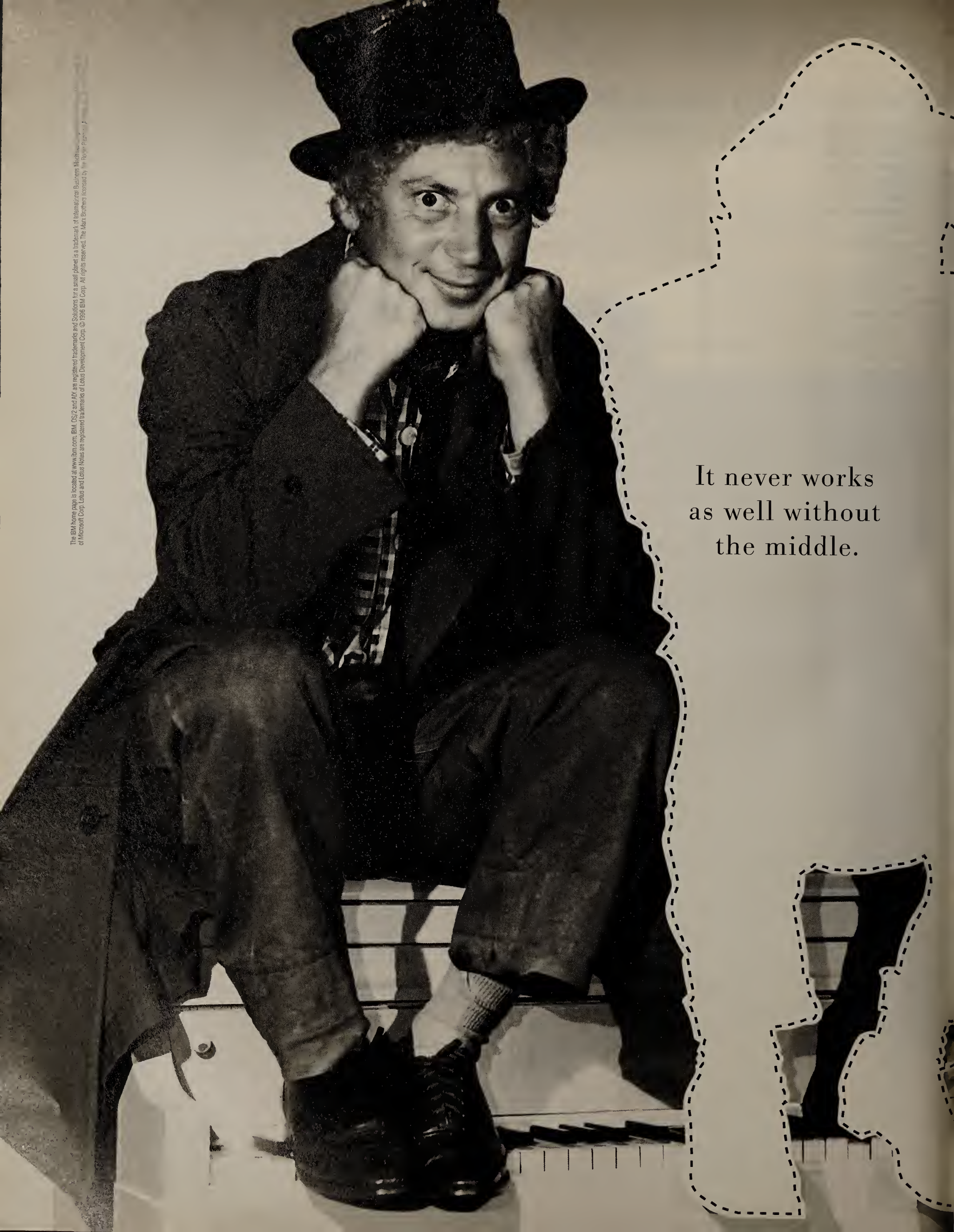
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Trio targets central office FRAD mart

By Michael Cooney

A trio of central office (CO) frame relay access devices recently announced new products that promise to simplify frame relay access for branch offices.

Frame Relay Technologies, Inc., Netlink, Inc. and Sync Research announced new CO frame relay access devices

(FRAD) that each claims will reduce the cost of installing large-scale frame relay networks by concentrating existing frame relay circuits at the data center.

The three CO FRADs are aimed at users with large amounts of SNA traffic. All of them work by converting the legacy traffic, such as Synchronous Data Link

Control, into a frame relay format.

While the CO FRADs are targeted at large, private frame relay users, all of the vendors also hope to land lucrative telephone company contracts with the new devices, though none are willing to say which carriers may use their equipment. For the user, those relationships ensure interoperability, but they also can force them to use a particular vendors' equipment, analysts said.

Analysts also said the rush to push CO-type FRADs is a tactical response to low-cost branch office FRADs.

"These guys are looking to eliminate the need for the simple FRAD while at the same time, answer the growing demand from SNA users to convert their existing private leased lines to frame relay," said Paul Wickre, principal analyst at Frame Relay Systems and Technology, Inc., Washington, D.C.-based consultancy.

Frame Relay Technologies has rolled out its Central Office Switching FRAD, a scalable eight- to 64-port FRAD that supports line speeds from 2.4K to 2M bit/sec. It can switch traffic between local ports to reduce permanent virtual circuit usage and to automatically route around failed PVCs.

Netlink announced its NetFRAD box, a 15- to 24-port capable device that supports line speeds up to 2M bit/sec. NetFRAD supports Netlink's existing SafeLinux software, which provides for SNA prioritization and adaptive burst-rate support.

Those features are designed to prevent congestion and ensure prompt delivery of SNA traffic.

Over at Sync Research, the company will deliver its InterXchange FRAD. The InterXchange FRAD can support up to 12 T-1 interfaces and concentrate up to 176 SDLC lines to a central site.

Analysts noted the differences between the CO FRADs, including one announced by Hypercom, Inc. last month, are minuscule. For example, Sync and Netlink products are manageable from IBM's NetView/390 package; the others are not. Also, Sync and Hypercom products can multiplex more low-speed SDLC lines than the others, analysts said.

"Their claim to fame will really be which carrier picks them as their frame relay access supplier," said Anura Gurugé, an independent analyst based in New Ipswich, N.H. "By their nature, they don't support multiprotocol traffic so they really have a limited tactical function."

Frame Relay Technologies' CO FRAD is available now for prices starting at \$5,000. Netlink's NetFRAD will be available in the second quarter for prices starting at \$30,000. Sync's InterXchange will be available in May for prices starting at \$30,000.

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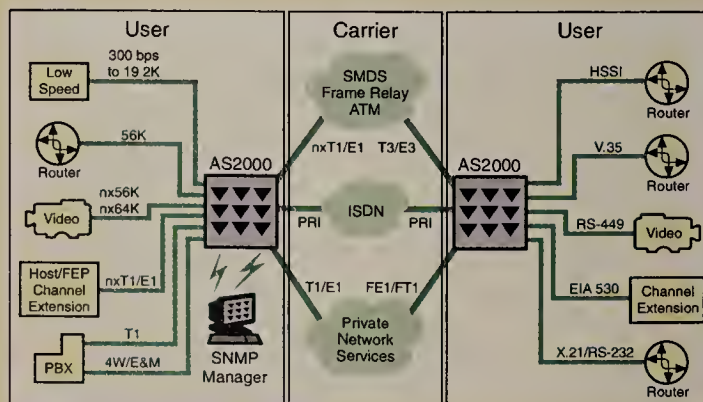
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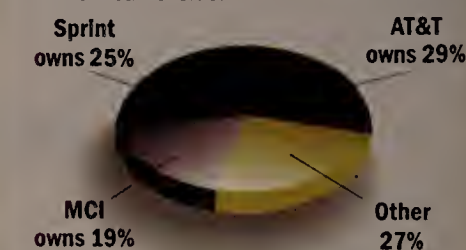


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Frame relay market bits

- ▶ 1995 market value: \$630 million, with 229% growth over 1994
- ▶ IDC forecasts continued market growth, due in large part to SNA-to-host line aggregation
- ▶ On the carrier side:



SOURCE: IDC, FRAMINGHAM, MASS.

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Circle Reader Service #85

Help desk

Continued from page 21

through browsers such as Netscape Communications Corp.'s Navigator or Microsoft Corp.'s Explorer. The E-mail facility allows users to access the PowerHelp database from remote locations using popular E-mail packages such as Microsoft Mail, Lotus Development Corp.'s cc:Mail and Lotus Notes.

PowerHelp's integration with leading management platforms, such as Hewlett-Packard Co.'s OpenView and IBM's NetView, helps to quickly notify support desk personnel of net problems. And support for Fulcrum Technologies, Inc.'s Search-Server information retrieval system gives PowerHelp 2.2 users a high-speed hypertext gateway to all information in the PowerHelp knowledge base.

PowerHelp 2.2 is priced at \$2,500 per

seat. It is available now.

Peregrine, meanwhile, has enhanced the data collection, correlation and reporting capability of its ServiceCenter help desk software. ServiceCenter 1.3 includes new agent technology that mines data from diverse locations and dynamically publishes it across the net so it can be displayed on users' desktops. This capability is intended to eliminate the redundant processing activities usually experienced

by help desk personnel who monitor, analyze and notify users about problems.

"It certainly sounds very powerful," said Jill Huntington-Lee, lead analyst at Datapro Information Services Group in Delran, N.J. "They have developed their own agent with a more comprehensive [management information base]. It looks like they're going to be pulling together something quite comprehensive over the next couple of years, and I think this is the start of that kind of strategy."

Pricing for ServiceCenter 1.3 begins at \$9,120. The product is available now.

Help for the help desk

Astea International — Powerhelp 2.2, with World-Wide Web support, E-mail access to databases, integration with leading network management packages, and improved data search and retrieval capabilities.

Cambio — Command 2.3, with the ability to design, document and track variable bandwidth and switched WAN circuits.

Peregrine — ServiceCenter 1.3, which features enhanced data collection, correlation and reporting through new agent technology.

Lastly, Cambio is shipping Version 2.3 of its Command change management software, which includes the ability to design, document and track variable bandwidth and switched WAN circuits. With Command 2.3, users can divide WAN circuits into partitions that map to the amount of bandwidth they want for each WAN service or application. Users can also model switched virtual circuits and track information on circuit address, speed, interface type, maintenance provider and contracted service levels.

All of this information can be fed to a help desk system, such as PowerHelp or ServiceCenter, for a top-down view of enterprise network devices and circuits.

Pricing for Command 2.3 starts at \$17,500.

©Astea: (215) 822-8888; Cambio: (408) 567-1400; Peregrine: (800) 638-5231.

Larscom

Continued from page 21

interfaces on other modules in the platform, such as a T-1 link to a private branch exchange. A module with a DS3 interface is in development. The entire platform is Simple Network Management Protocol-manageable.

EtherSpan, meanwhile, is an Ethernet bridge made to connect LANs across the wide area.

It is designed with a 10Base-T Ethernet port and a single high-speed serial interface that can handle traffic up to 10M bit/sec. It has no direct carrier interface, such as a T-1; the device would have to be used in conjunction with a data service unit. EtherSpan is SNMP-manageable through either the LAN or WAN ports, or a pair of RS-232-C ports.

The NCM and DCM each cost \$13,000.

EtherSpan is now available at a list price of \$3,700.

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NW 4/1/96

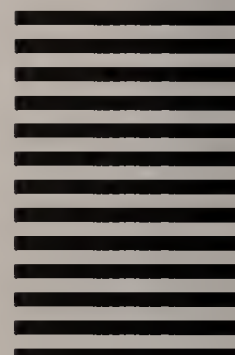


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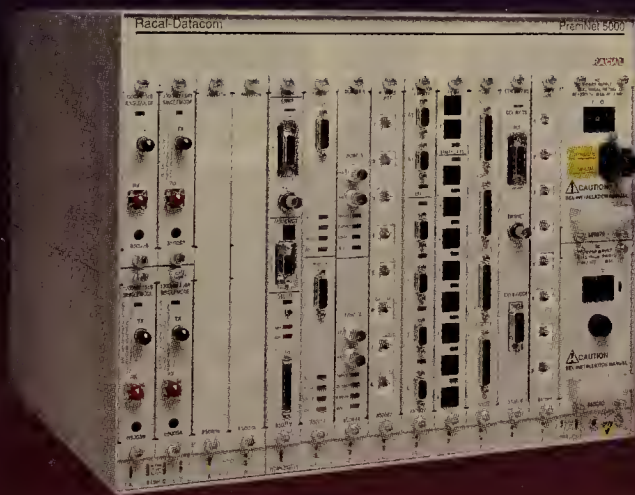


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IBM

Continued from page 21

As for IBM's rollout, it added HPR to its 2217 multiprotocol concentrator, 3172 Interconnect Controller and Communications Server for OS/2 Warp. It also restated that HPR would be available in the 3746 Model 900 and stand-alone Model 950 front-end processor follow-ons by the end of the year. The 2210 router

also will gain HPR support, Arnette said, but not until late 1996 or early 1997. HPR is already supported in IBM's 3174 controller and 6611 router (see graphic, page 21).

"HPR is the glue that will help ensure the performance of existing applications during the transition from point-to-point networking to peer, switching and ATM networking," said Thomas Nolle, president of CIMI Corp., a consultancy in

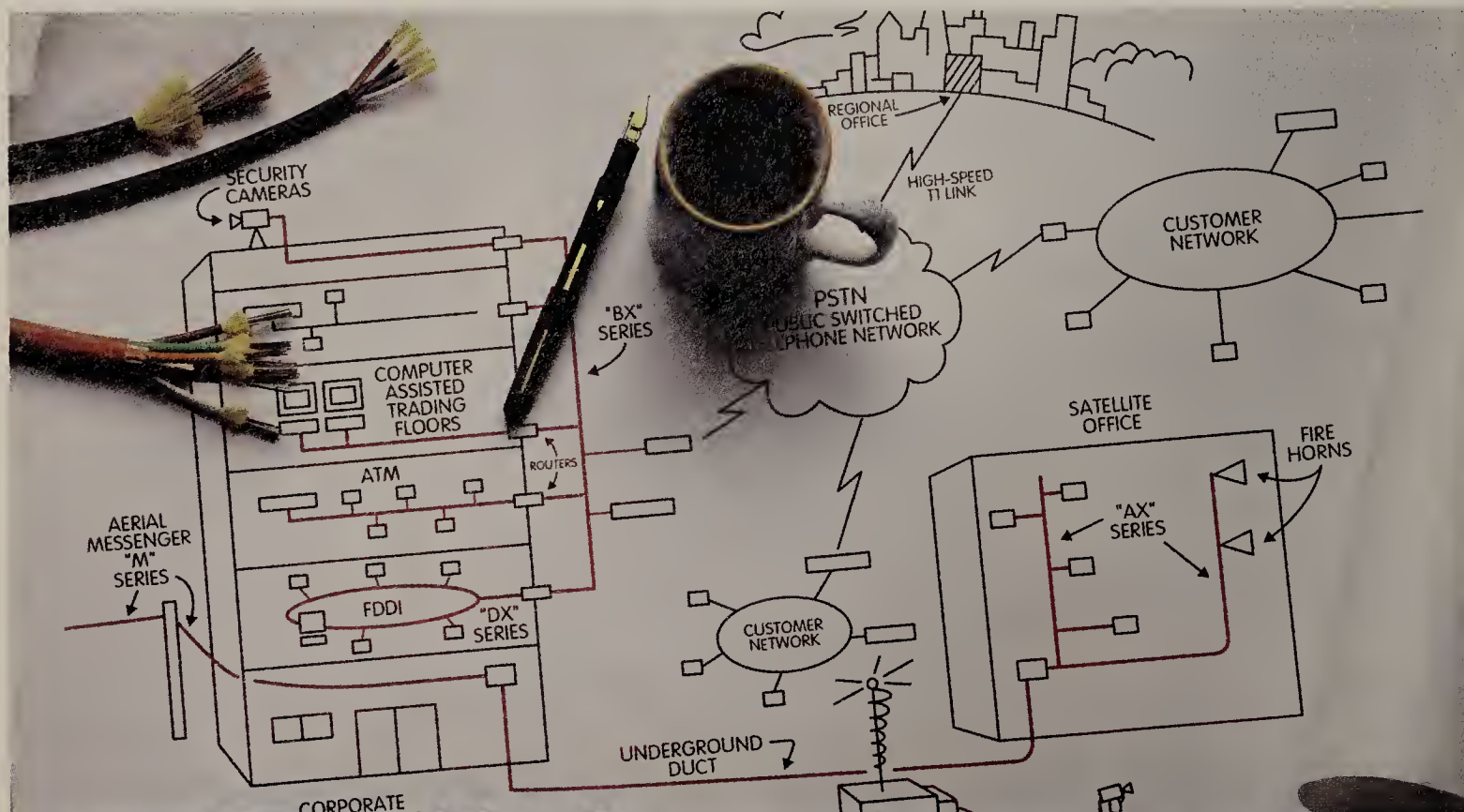
Voorhees, N.J.

While HPR support in key IBM communications componentry is an important consideration for big SNA shops, IBM's strategy goes a bit further. Because the company has bundled its AnyNet technologies with the 2217, OS/2 Communications Server and VTAM, IBM can help users to build a single protocol backbone — based on HPR — capable of handling multiprotocol traffic.

AnyNet is IBM's multiprotocol conversion technology that lets applications communicate regardless of the underlying communications protocols. By combining AnyNet and HPR in VTAM 4.3, as well as on other major communications nodes in an enterprise, users could employ an APPN/HPR backbone as a high-speed multiprotocol transport system.

Central to the single backbone protocol strategy is getting HPR and AnyNet spread across the enterprise — no easy task since neither technology has much mindshare in the user community.

"APPN/HPR and AnyNet are by no means forgone conclusions in the marketplace, which adds an extra burden on IBM to prove their worth," said Anura Guruge, an independent analyst based in New Ipswich, N.H. ■

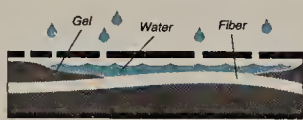


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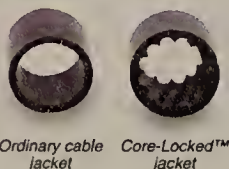


Gel-filled cables leave delicate optical fibers exposed to the damaging effects of water.

2. STRESS SHORTENS FIBER LIFE

Routine stress, such as tight bends or rough handling during installation, can degrade fiber life and lead to premature failure. While our competitors settle for fibers proof-tested at 50kpsi, our Ultra-Fox™ cables are proof-tested at 100kpsi to guarantee durability and vastly extend fiber life.

3. NOT ALL CABLE JACKETS ARE CREATED EQUAL



Unlike the standard sleeve-type cable jacket, our Core-Locked™ jacket is extruded under high

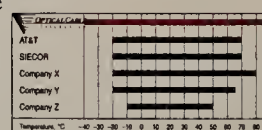
pressure over the cable's core. This provides 25% more jacket material for enhanced strength, and prevents slippage and jacket damage during installation.

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Advanced construction features such as a 900µm tight buffer and 100kpsi proof-tested fibers, along with water-, fungus- and UV-resistant design, make Ultra-Fox™ cables durable and flexible enough for both indoor and outdoor use. The result is higher reliability with lower costs for installation and maintenance.

5. EXTREME TEMPERATURES CAN CAUSE FIBER FAILURE

Designed with the best attributes of military tactical cable, Ultra-Fox™ cables have an operating temperature range 25% greater than our competitors' cables, so they can better withstand temperature extremes caused by weather, machines, and HVAC systems.



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Stripping conventional gel-filled cables usually requires cleaning solvents, fanout tubes, splice trays, and other splice equipment, and a lot of labor. With tight-buffered cable, all you need is a cable-stripping tool and a connector. With this speed and simplicity, our Ultra-Fox™ breakout cable reduces termination costs by as much as two-thirds.

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BusinessBriefs

Polycom, Inc. of San Jose, Calif., has entered into an OEM agreement to provide AT&T equipment spin-off **Lucent Technologies, Inc.** with a private-label version of Polycom's SoundStation conference phone. The SoundStation has three built-in microphones that can pick up voices from any direction. It can be used behind a private branch exchange or key system, or on a stand-alone basis.

ECI Telematics International, Inc. and **Verifone, Inc.** will announce at NetWorld+Interop 96 an alliance to develop and market transaction systems, including SmartNet, a network controller for tracking payment transactions from input at the point-of-sale terminal, to the host computer and back. The products will be distributed through Verifone.

Ernst & Young last week announced that it will standardize on Lotus Development Corp.'s Notes Release 4 as a global electronic messaging system. The firm's worldwide organization already has more than 25,000 Notes users, and the new licenses will bring the total to over 66,000.

Network General Corp. and **NetSys Technologies, Inc.** announced a distribution agreement that allows Network General to resell NetSys' line of network design, simulation and performance analysis tools.

These tools can assist Network General Sniffers in identifying impacted or problem areas of the network, the companies said. The NetSys tools are available now from Network General.

Ascend Communications, Inc. last week announced reseller agreements with **Bell Atlantic Corp.** and **US WEST, Inc.** for Ascend's remote access products. US WEST will resell the Ascend MAX central-site switches that support ISDN, frame relay and analog traffic, as well as Ascend Pipeline remote-office devices that support ISDN, IP and IPX traffic. Bell Atlantic will resell Pipelines.

Carrier Services

Covering: Local and Long-Distance Services • Value-Added Networks • Cable, Satellite and Wireless Networks • Regulatory Affairs • Carrier-Based Internet Services

Briefs

■ **President Clinton** has proposed a \$46.8 million increase over current levels for the Federal Communications Commission's fiscal year 1997 budget. Commission officials claim the money is sorely needed to implement the **Telecommunications Act of 1996**. But Republicans are pressing to keep the FCC's appropriation at or below current levels.

Meanwhile, the **FCC** has extended the deadline for comments on the petition by America's Carriers Telecommunications Association (ACTA) to bar **telephony applications over the Internet** (NW, March 11, page 6). Comments should now be filed by May 8 at the FCC, 1919 M Street, Washington, D.C. 20554, and should reference Rulemaking No. 8775.

An interest group called the Voice On the Net Coalition (<http://www.von.org>) has formed to thwart ACTA's efforts.

■ **AT&T** last week said it has implemented an indirect sales channel for its **AT&T NetWare Connect Service**. The new sales agents, which number more than 80, are all Novell, Inc. Gold and Platinum resellers.

■ **Long-distance carrier LCI International, Inc.** has been awarded a two-year contract worth an estimated \$3.6 million by CompuServe, Inc. LCI will offer both outbound and inbound 800 services to provide **customer access to CompuServe's on-line network**.

■ **Telco Systems Corp.** of Norwood, Mass., is adding ISDN Basic Rate Interface Transmission Extension functionality to its Access60 Network Access Server.

The goal is to **extend the reach of ISDN** beyond the standard 18,000 feet from the central office (CO) without requiring digital repeaters, which typically add to users' costs. Sold to carriers, the Access60 is a multiplexer that usually operates in pairs — with one sitting in or near the CO switch, and one in a remote terminal in or near customer premises.

User mines benefits of multivendor frame relay

By Joanie Wexler
Washington, D.C.

Just because you need frame relay coverage in widely dispersed places doesn't mean you have to go with one of the nationwide carriers.

The United Mine Workers Association Health and Retirement Funds, for one, has decided it fares better on service and its monthly bill with a multivendor frame relay network.

The network is provided by Bell Atlantic Corp. and the UniSpan frame relay consortium, a group of regional interexchange carriers (IXC). Member EMI Communications Corp. serves as the network's primary IXC, coordinating troubleshooting and negotiating with local carriers for dedicated access.

This type of net is possible because of the Network-to-Network Interface, a standard that allows carriers' frame relay networks to interoperate.

The Funds dumped a 9.6K bit/sec X.25 network running SNA traffic last summer in favor of frame relay to link LANs replacing IBM System/36s in eight field offices. The X.25 network yielded painfully slow 25- to 30-second response times.

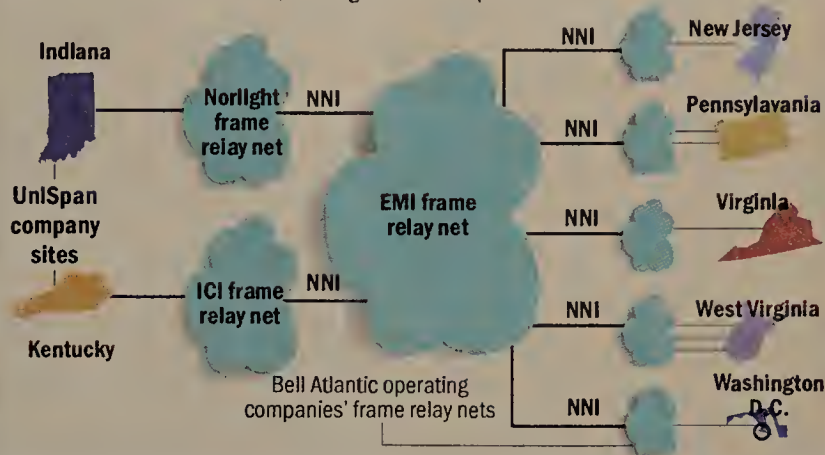
"It was sometimes taking two weeks to get information to retirees," said Ken Toth, senior manager of systems and automation.

The Funds needed a faster network that could support PC applications and provide access to multiple hosts simultaneously.

The Funds was shocked when it found it could run a frame

The team approach to frame relay networking

The combination of frame relay networks from Bell Atlantic and three UniSpan companies via the Network-to-Network Interface (NNI) puts frame relay switches closer to UMWA Funds sites, making calls less expensive and more reliable.



relay net at 56K bit/sec to T-1 speeds for only \$200 a month more than what it was shelling out for the X.25 net. And the company is paying thousands less each month for its eight-site net than it would for services from some of the big names in frame relay, such as AT&T, MCI Communications Corp. and

Sprint Corp., the Funds' former X.25 service provider.

A major benefit of the UniSpan network is that it includes a group of regional networks, each dense with frame relay switches. That means the distance from the Funds' sites to the nearest switch is fairly short and, as a result, inexpensive.

"The other carriers couldn't provide a competitive bid because our locations are so remote," and the nearest frame relay switch to a given site might be several states away, Toth said.

Sites along the Eastern seaboard link through the Bell Atlantic frame network to EMI, which serves as the IXC between Bell Atlantic networks and the nets of UniSpan partners Norlight Telecommunications in Indiana and Intermedia Communications, Inc. (ICI) in Kentucky.

Dave Wilsey, the Funds' manager of network administration and technical support, said at first he wasn't aware that Norlight and ICI were participating in his network.

"Technically, EMI should have told us, but they were probably smart not to. In theory, having multiple carriers sounds terrible. But in practice, it works very well," he said.

In fact, Wilsey was originally leery of having even two firms — Bell Atlantic and EMI — involved. And when the Funds' net initially came up, there were finger-pointing problems with Bell Atlantic and EMI during outages, he said. But EMI stepped up to take on centralized troubleshooting. Wilsey said service is at a level where he wouldn't trade it for a lower priced service from other carriers. ■

Pacific Bell intros network design services

By Tim Greene

Following the lead of other regional Bell operating companies, Pacific Bell last week announced a subsidiary dedicated to designing, installing and monitoring networks.

Pacific Bell Network Integration is immediately serving up two packaged offerings: Office Pack remote LAN access and Internet Support. It also will offer custom network services.

The company is developing other packages for network management, desktop video and col-

laborative workgroups.

Office Pack, designed for companies with 50 or more remote sites, features an ISDN Basic Rate Interface line and two tiers of service. One offers a Motorola, Inc. Bitsurfer terminal adapter and ISDN service for \$700 per site for the first year, including installation and a year of maintenance. After that, maintenance is \$50 per year per site. It also can include a 28.8K bit/sec modem or frame relay access device (FRAD), as well as the appropriate phone line.

A higher tier offers an ISDN line plus installation of an Ascend Communications, Inc. Pipeline router. It also includes net maintenance and network management, such as monthly reports — all for \$2,100 per site for the first year.

The Internet Support package includes a BRI line, Netscape Communications Corp.'s Navigator, a Cisco Systems, Inc. router and a Sun Microsystems, Inc. server. It also can include

firewalls, encryption and other security features. The prices range from \$5,000 to \$50,000 per site, depending on options.

Who they're after

In general, the company targets users with 100 to 1,500 desktops, and plans to sell standard service/hardware packages.

It will offer hardware including bridges, hubs, routers, servers, data service units/channel service units, terminal adapters and frame relay access devices.

Pacific Bell Network Integration will manage these devices in an enterprise for varying prices. The subsidiary will use hardware from Ascend Communications, Inc., Bay Networks, Inc., Cisco, Compaq Computer Corp., ADC Kentrox, Motorola, Newbridge Networks Corp. and Sun.

Pacific Bell is behind other RBOCs in offering this type of service, according to Robert Rosenberg, president of Insight Research Corp., a Livingston, N.J., telecommunications market research firm. In 1985, the firm started PacTel Spectrum Services, which offered net monitoring, but it sold that business to IBM in 1988. ■

Where did BellSouth Network Integration go?

Citing more customer demand than it could handle and trouble finding qualified staff, BellSouth Network Integration recently dissolved. Key areas were absorbed into other sectors of BellSouth, such as:

Equipment	BellSouth Business Systems
Network management	BellSouth Electronic Commerce and Internet Services
Consulting and design	BellSouth is looking for and independent partner
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Multiple WAN protocols start to concentrate

Monthly rates per port for Bell Atlantic's IP Routing Service:

Type of port	1-year plan	3-year plan	5-year plan
Analog dial-up	\$2,250	\$1,800	\$1,725
ISDN dial-up	\$1,500	\$1,250	\$1,150
Digital data service	\$80	\$60	\$50
Dedicated T-1	\$450	\$350	\$330
56K bit/sec frame relay	\$45	\$30	\$28
T-1 frame relay	\$650	\$550	\$500

SOURCE: BELL ATLANTIC, ARLINGTON, VA.

Bell Atlantic breathes Internet life into SMDS

By David Rohde

Washington, D.C.

Bell Atlantic Corp. soon will give Internet service providers and intranet managers a way to serve large numbers of dial-up

users without a massive investment in modems and ISDN terminal equipment.

In the process, the carrier hopes to breathe new life into Switched Multimegabit Data Service, a cell relay service struggling to emerge from the shadow of frame relay and Asynchronous Transfer Mode.

Under Bell Atlantic's new IP Routing Service (IPRS), traffic from thousands of analog and ISDN dial-up users — plus those with private-line or frame relay connections — can be concentrated at one central office per local access and transport area. From there, the carrier converts the entire traffic stream into SMDS cells for shipment at speeds of up to 34M bit/sec to an ISP or intranet operator's network access point.

"Today, ISPs are buying thousands of [plain old telephone service] lines and modem pools," said Karl Rookstool, director of internetworking for Bell Atlantic's Large Business Services division. But with IPRS, ISPs can dispense with that equipment in favor of "one or two SMDS lines," he said.

According to Bell Atlantic officials, IPRS also will be pitched to universities, municipal governments and other enterprises with many distributed end points, such as off-campus students. Because these organizations' emerging enterprise-wide intranets potentially encompass so many users, their traffic requirements exceed the typical T-1 limit of frame relay. And because SMDS is a connectionless service that does not rely on preestablished permanent virtual circuits (PVC), IPRS subscribers can offer their end users the benefits of fast-packet routing without configuration delays.

To make the service work, ISPs or intranet managers still have to seek out a high-capacity switch or router with an SMDS interface, Rookstool noted. As it happens, the fast-packet switches favored by many ISPs — those from Cascade Communications Corp. — have built-in SMDS support, said Christine Heckart, senior broadband analyst for TeleChoice, Inc., a consulting firm based in Verona, N.J.

Then, instead of making a heavy investment in modems and ISDN termination equipment, IPRS subscribers would pay Bell Atlantic's prices for the service based on their end users' access methods (see graphic).

Heckart did caution that since Bell Atlantic is still restricted to providing service within LATAs, the service is now only useful for IP-based intranets if the end points are geographically concentrated.

IPRS is slated to be unveiled later this quarter if the Federal Communications Commission approves Bell Atlantic's pending tariff for the service. Regional Bell operating companies are not affected by the FCC's historic proposal last month to end tariffs for long-distance carriers, since the FCC still considers RBOCs near-monopolies requiring close regulation of rates and services. ■

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INSIDE LAN WORLD

Matchmaking between applications and high-speed LANs.

Page 4L

Attachmate, Software Artistry launch management tools.

Page 8L

Network General to help companies analyze exploding Web-based traffic.

Page 8L

Dave Kearns says to go beyond the numbers to choose the right NOS.

Page 10L

Melinda Le Baron & Skip MacAskill are frustrated with VLAN technology progress.

Page 11L

Briefs

■ **McAfee** has announced Windows NT versions of **VirusScan** and **NetShield**, its client and server-based **virus scanning and protection software** products. The products scan constantly through a virtual device driver and capture viruses during disk insertion and file reads, writes, copies, creations and renames. Both products can also be configured to automatically scan certain disk drives or folders at different times of the day. **VirusScan 2.5** for NT workstations is priced at \$65, and **NetShield 2.5** for NT servers is priced at \$450 for 25 users. Both are shipping.

McAfee: (408) 988-3832.

■ **Vinca Corp.** announced **StandbyServer** for Windows NT last week, a **server mirroring software** product that shifts the workload from a frontline NT server to a backup one within a minute. The package includes software that initiates the fail-over process and sends an alert to an administrator through tie-ins to the NT event log. This is the first Vinca product to use an Intel Corp. Ethernet card instead of a proprietary one from Vinca. **StandbyServer** will be available at the end of this month for \$2,999.

Vinca: (800) 934-9530.

Servers learn how to route

Cisco, Compaq and Novell target sites looking to avoid complexities of traditional routers.

By Paul Korzeniowski

Riding the integration wave, some networking vendors have developed products that make it as easy to route data from a LAN server as it is to store files on or print documents from one.

In developing integrated LAN servers, companies such as Cisco Systems, Inc., Compaq Computer Corp. and Novell, Inc. are taking aim at small and midsize businesses. They are targeting companies that do not want to take on the complex configuration and management chores associated with stand-alone routers.

Analysts said the number of users adding routing functions to servers is tiny today but will grow significantly over the next few years. "Small corporations want simpler network installation, and integrating routers and LAN servers offers them that," said Charlie Robbins, vice president of communications research at Aberdeen Group, Inc., a Boston consultancy.

The ability to develop routers for servers and other devices comes with the maturation and commoditization of the technology. Traditional routers operate as autonomous network devices that require their own network management software. This isn't necessary with integrated routers, which can be controlled by the host system's management software.

Novell's approach

Novell, for instance, sells routing software that runs on LAN servers as a NetWare Loadable Module (NLM). The software, dubbed MultiProtocol Router (MPR), uses NetWare management features.

Novell began offering MPR three years ago. The NLM handles AppleTalk, SNA, IPX and TCP/IP. For wide-area connectivity, MPR supports asynchronous dial-up services, ISDN connections or leased lines that operate at speeds up to the T-1 rate of 1.544M bit/sec.

MPR helped Waste Services, Inc., a waste disposal firm, cope with network growth. The company has 500 users stationed at

three locations: the corporate headquarters in Warren, Ohio; a transportation services division in Catonsville, Ohio; and an environment services group in Export, Pa.

As LAN usage increased, Waste Services needed a way for users at the different sites to share information. In the summer of 1994, the company examined routers from Bay Networks, Inc., Cisco, CrossComm Corp.

and Novell. It was attracted to MPR because NetWare management tools could control it, said Phil Wargo, corporate network manager at Waste Services. The Novell product was installed at the company's three locations.

Wargo listed only one complaint about MPR: The management interface is too complex and difficult to use. It needs better windowing and drag-and-drop capabilities, he said.

"Routers resemble minicomputers. They are proprietary systems that require firms to purchase all add-on components from one supplier. There is a need to open up these systems."

Doug Pushard, Compaq



Nonetheless, Waste Services has remained loyal to Novell and has followed its lead elsewhere. It

See Servers, page 2L

Vendors to drop ATM bomb at Interop show

By Jodi Cohen

Las Vegas

Fore Systems, Inc. this week will show off new software and hardware designed to help companies migrate from legacy LANs to Asynchronous Transfer Mode.

The company is rolling out a new version of its ForeThought ATM software, which acts as the

glue between Fore's products and provides the connection between end users and applications over an ATM network.

check out new 155M bit/sec ATM modules for Fore's PowerHub 7000 backbone LAN switch, which was obtained via Fore's

ATM vendors make splash at Interop

Vendor	Product	Price	Availability
Agile	100Base-T module for its ATMizer Ethernet-to-ATM switch	\$2,500	May
Fore Systems	ForeThought 4.0 internetworking software	Free upgrade for existing customers	Now
	PowerCell 700 ATM module for the PowerHub 7000	\$12,995	Later this month
	ATM module for the ES-3810 Ethernet workgroup switch	\$3,495	Now
Scorpio	Stinger-5 ATM backbone switch	\$1,250 per port	Later this month

Novell preps NDS Internet enhancements

By Kevin Fogarty

Salt Lake City

Novell, Inc. is working hard to Internet-enable NetWare.

As the company announced at its BrainShare '96 conference last month, it is pushing NetWare as an intranet server based on NetWare Web server software and technology from partners such as Sun Microsystems, Inc. and Open Market, Inc.

But Novell's most concerted Internet-related efforts will center around NetWare Directory

See NDS, page 6L

See how other companies are Internet-enabling their directories on Network World Fusion (<http://www.nwfusion.com>). Select News+ then Local Networks.



Through its support for the ATM Forum's LAN Emulation (LANE) 1.0 standard, ForeThought 4.0 allows companies to run existing applications over ATM nets without modification. Also, the software lets legacy devices connect to ATM networks.

In addition, ForeThought 4.0 offers early support for Private Network-to-Network Interface (P-NNI), the protocol for routing calls between switches. The ATM Forum has not yet finalized the specification, but Fore plans to tweak its software when the standard is completed. Joe Skorupa, director of marketing at Fore, said the P-NNI implementation demonstrates how scalable ATM really is by letting net managers link as many as 2,500 ATM switches.

Customers will also be able to

acquisition of Alantec Corp., and the ES-3810 Ethernet workgroup switch, which Fore brought into its fold by purchasing Applied Network Technologies, Inc.

Agile adds Fast Ethernet

Separately, Agile Networks, Inc. and Scorpio Communications will make ATM-related announcements of their own at NetWorld+Interop '96.

Customers will get a first-hand look at Agile's new 100Base-T module for its ATMizer 125 Ethernet-to-ATM switch. The module — Agile's first stab at Fast Ethernet — will allow each switch to support any combination of up to five 100Base-T or 155M bit/sec ATM ports, in addition to 12 Ethernet ports.

See Interop, page 5L

Servers

Continued from page 1L

chose Novell's remote communications services software for its three sites in order to handle an increasing number of remote users.

Waste Services could have added the communications functions to existing LAN servers. Instead, the company purchased one set of PCs to run the asynchro-

nous communications and routing software.

"Communications functions, especially the asynchronous connections, can be processor-intensive," Wargo explained. "Our users work with database applications and expect fast response times. The company did not want to create any response-time problems for them."

This setup is typical, said Mark De La

Vega, a product-line manager for inter-networking products at Novell. "Many organizations separate communications functions from daily business applications," he said.

In addition to creating problems with response times, integrating communications services on the applications server introduces a single point of failure. If a communications problem arises, it could knock daily business applications off-line.

Cisco's line

As Novell delivered MPR, Cisco began selling routers that plug into servers. "Companies want to link more of their branch locations to their networks. They need products that are simpler to install than even our low-end routers," explained Dean Schoen, manager of business development at Cisco in San Jose, Calif.

The AccessPro routers for NetWare servers work with Ethernet or token-ring LANs. One model comes with an ISDN Basic Rate Interface link, and a second features leased-line connections for transmission speeds up to T-1.

Another router, the CPA1120, runs on Microsoft Corp. Windows NT servers. "Many large companies are establishing Windows NT as their standard LAN operating system and relying on Microsoft's [Systems Management Server] to monitor branch office connections," Schoen said.

Even with strong customer interest in Windows NT, Schoen admitted that sales of the two product lines have been slow. "Computer resellers may not have been ready to push these products through to small and medium businesses," Schoen said.

Compaq's push

Compaq's recent and quick entrance into this arena may help solve that problem. The company, a leading server vendor that relies heavily on resellers to distribute its wares, licensed Cisco's routing software last June. It acquired Thomas-Conrad Corp., a supplier of network interface cards and wiring hubs, in October and NetWorth, Inc., which makes hubs and switches, shortly thereafter.

With these moves, Compaq gained the pieces it needs to develop servers with integrated routing, switching and hubbing capabilities. But that is a long-term goal, said Doug Pushard, vice president for the internetworking products group at Compaq in Houston.

Initially, the company plans to turn routers into inexpensive commodities by porting the Cisco software to standard PC components, Pushard said.

Compaq has not established a time frame for delivering the PC components, but analysts said that should happen within the year.

Full integration could be a few years away, they added. Before the company can offer an integrated server, it needs to enhance its InSight Manager network management system so it can oversee the NetWorth and Thomas-Conrad products.

If Compaq completes its work, the company should have buyers for the integrated wares. Networking technology is quickly becoming ubiquitous, but management continues to be a burden. Adding routing functions to LAN servers should ease installation and maintenance, and make it simpler for many firms to run their nets.

Korzeniowski is a freelance writer in Malden, Mass., who specializes in networking issues.

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High-speed network matchmaking

Some advice on picking the right LAN technology for your applications.

By Kathryn Korostoff

If you ask a group of network managers which high-speed LAN alternative they plan to adopt, the majority will name Fast Ethernet.

However, a close look at emerging network applications suggests there may be a mismatch between the technology many users plan to adopt and their application needs.

Many emerging applications have special requirements, and Fast Ethernet is not well suited for them all. Five high-speed LAN alternatives exist today, and more are on the way. The current set includes Asynchronous Transfer Mode, Fast Ethernet (100Base-T), 100VG-AnyLAN, FDDI and Fibre Channel (see graphic).

Several applications are burgeoning sources of network traffic. In a recent survey of 125 network managers, Sage Research, Inc. found strong deployment plans for image processing, videoconferencing and data mining/data warehousing (see graphic, page 5L). These applications all have specific network requirements, making a close look at how the applications match up with different high-speed LAN technologies worthwhile.

IMAGE PROCESSING

ATM	★★
Fast Ethernet	★★★
100VG-AnyLAN	★★★
FDDI	★★
Fibre Channel	★

★★★ Excellent fit
★★ Adequate fit
★ Poor fit

Image processing can include a number of tasks, the most common of which are electronic forms processing and storage, workflow and high-speed scanning. Network traffic from imaging applications usually is characterized by the following:

- Large file sizes. But thanks to compression algorithms, imaging files are usually manageable. So just because your organization's use of imaging is increasing, you won't necessarily need a migration path to gigabit networking.
- Irregular traffic flows. Image traffic is often time-of-day related or fluctuates according to business processes.
- Peer-to-peer networking. The

traffic is often server-centric but can also be peer-to-peer. In organizations where there are large quantities of images being stored, optical jukeboxes or other large-capacity storage devices are common. The greatest bottleneck problems caused by image traffic tend to be at the server or central storage device.

■ Delay tolerance. Image traffic is usually not as delay-sensitive as other applications, such as video traffic. Therefore, high-speed LAN technologies that deliver quality-of-service (QoS) guarantees are not as critical for image traffic as they are for other applications, such as video traffic.

Sheer bandwidth is the key criteria for image traffic, so any of the high-speed LAN alternatives will be of benefit. However, since image traffic does not usually require sophisticated bandwidth management schemes and probably won't require scaling to gigabit pipes, ATM might be unnecessary.

In contrast, due to their comparatively low cost and compatibility with existing LAN infrastructures, Fast Ethernet or 100VG-AnyLAN will be cost-effective choices.

Further, in those organizations where image processing tends to have a peer-to-peer pattern, the best choice may be a technology that can be widely deployed — possibly to the desktop and as a backbone — with the least disruption and lowest cost. Again, this suggests that Fast Ethernet or 100VG-AnyLAN are the best candidates.

REAL-TIME VIDEO

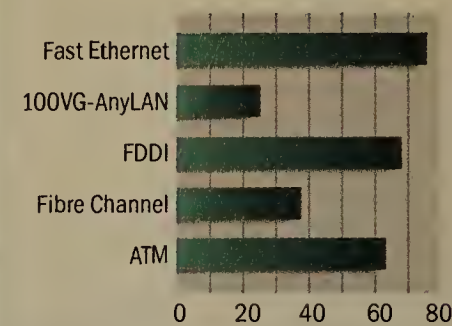
ATM	★★★
Fast Ethernet	★
100VG-AnyLAN	★★
FDDI	★
Fibre Channel	★★★

If video is an emerging source of network traffic, the following network needs must be met:

- Sheer bandwidth. Video transmissions typically take anywhere from 1.5M bit/sec to 15M bit/sec, depending on compression algorithms.
- Predictability and low delay. Video quality degrades with just a few milliseconds of lag.
- Scalability. Many organizations are uncertain about if, how and when video will proliferate. If it seems likely that the amount

LIKELIHOOD OF EVALUATING SPECIFIC HIGH-SPEED LAN TECHNOLOGIES

Percentage likely to evaluate
(More than one response allowed)



Based on a survey of 125 network managers.

GRAPHIC BY TERRI MITCHELL

SOURCE: SAGE RESEARCH, NATICK, MASS.

of video traffic will increase, a network that can grow beyond 100M bit/sec will be key.

ATM certainly meets the requirements. With guaranteed bandwidth and QoS capabilities, the video traffic will receive the service it requires. (While the ability of applications to negotiate QoS is still scarce, this will improve over the next six months with some new product announcements and APIs.) Also, ATM is scalable.

Fibre Channel is another good option, offering credit-based flow control in addition to sheer bandwidth. Currently available products offer 266M bit/sec, while the standard for full-speed Fibre Channel is 1.06G bit/sec.

100VG-AnyLAN also supports real-time needs. It uses a token-passing access method that delivers highly deterministic performance. This is due to the Demand Priority Access Method at its core. However, until gigabit Ethernet standards become a reality — and you shouldn't hold your breath — VG-AnyLAN does not offer the scalability that organizations expecting large volumes of video will require.

DATA WAREHOUSING

ATM	★★★
Fast Ethernet	★★★
100VG-AnyLAN	★★★
FDDI	★★★
Fibre Channel	★★★

A little more than half of the organizations that we recently surveyed reported that they will be using data mining/data warehousing applications by year-end 1997. By combining exist-

ing databases with querying and reporting tools, data warehousing delivers data for decision support and other advanced business applications.

Data warehousing typically involves dedicated servers and, increasingly, server clusters. The databases themselves often range in size from gigabytes to terabytes. The network connectivity required is for access to the servers and for interconnection between servers.

Let's look at the network needs for data warehouse server access:

■ Low delay. Data warehousing involves two types of traffic. The most common traffic consists of user queries, making response time an issue. Some delay is simply the amount of time for the database to come up with a result, and some is the time to deliver it over the network.

However, since dozens or maybe hundreds of users may be accessing the server or servers, response time can become an issue. But the delay sensitivity is not as great as it is for video and other multimedia applications.

■ Bandwidth. The second type of traffic is from backup or server synchronization. Updates between servers, which often include large database file trans-

fers, can generate huge amounts of traffic. Since servers may be dispersed throughout the organization, this can create a strain on existing shared LANs.

Because delay and QoS are not as significant for data warehousing applications as they are for some other applications, any of the high-speed LANs are a good alternative.

However, if the organization is deploying data warehouses providing access over the WAN, ATM would offer the best option for long-term LAN/WAN integration.

SERVER CLUSTERS

ATM	★★★
Fast Ethernet	★
100VG-AnyLAN	★
FDDI	★★
Fibre Channel	★★★

Server clusters are useful for many emerging applications, including data warehousing/data mining and other large database applications that require load balancing and fault tolerance.

Server clusters require a connectivity solution that will meet some of the following requirements:

■ Sheer bandwidth. If you're clustering high-end Unix servers, for example, you'll probably

Fibre Channel: High-speed LAN underdog

Many articles on high-speed LANs focus on Asynchronous Transfer Mode, Fast Ethernet, FDDI and 100VG-AnyLAN, but few include Fibre Channel.

Perhaps that's because Fibre Channel, until recently, has been deployed primarily by storage device vendors as a migration path for SCSI.

But the technology, courtesy of the ANSI X3T9.3 committee, has networking capabilities and some impressive features:

- Five specified speeds, ranging from 266M bit/sec to 4G bit/sec.
- Very low latency because it is a switched technology.
- Reliable flow control that ensures packets will not be dropped even under congestion.
- Distance up to 10 kilometers.
- Variable frame size.
- Runs over fiber or Category 5 cable.

Fibre Channel specifies three classes of service, allowing the link between two points to be customized:

Class 1: A fixed, circuit-switched connection appropriate for high-speed, constant links between two devices.

Class 2: A connectionless, frame-switched link that provides guaranteed delivery and receipt acknowledgement, appropriate for networks with critical traffic.

Class 3: Connectionless service without receipt information, appropriate for general network applications.

Fibre Channel offers the only gigabit standard available today but does not have WAN connectivity in its future. However, if very large data transfers are a significant source of campus traffic, Fibre Channel has the low overhead and sheer bandwidth ideal for such situations.

—Kathryn Korostoff

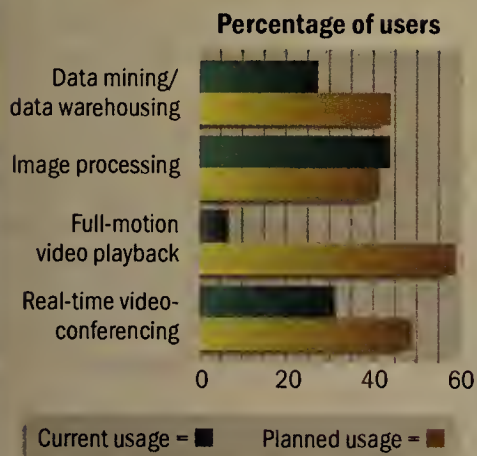
want a technology that can deliver at least 100Mbit/sec.

■ **Reliability.** With server clusters, the data-intensive nature of the applications require that packets don't get dropped, so flow control is critical.

■ **Distance.** Do clustered servers have to be physically collocated? Not necessarily, and if not, a technology that supports over 100M bit/sec and distances of at least one kilometer would be advantageous.

ATM and Fibre Channel both meet the sheer bandwidth and distance needs. ATM's QoS features can be used to deliver the reliability required.

APPLICATION ATTRACTION



Based on a survey of 125 network managers.

GRAPHIC BY TERRI MITCHELL

SOURCE: SAGE RESEARCH, NATICK, MASS.

Fibre Channel's flow control also provides the required reliability. A buffer-to-buffer approach ensures that packets won't be sent unless they can be received without being dropped. Thus, Fibre Channel does not drop packets even under congestion; it will simply wait to send the packets.

FDDI delivers the minimum speed and distance requirements, and the added benefit of reliability, thanks to its dual rings. But without a growth path, it's probably not the best choice.

Conclusions

A high-speed LAN installation that cannot scale to meet tomorrow's application needs will be obsolete before you can say "I-triple-E." While many organizations may be swayed toward Fast Ethernet due to comparatively low initial installation cost, the life-cycle cost will be much higher if new applications can't be handled appropriately.

Fast Ethernet is suitable for many organizations. But for those with increasing amounts of video or with an eye on server clusters, it may not be the best long-term choice. Determining what type of applications will be traversing the network in the future is essentially a guessing game. But an objective look at which high-speed LAN technologies offer the most flexibility for emerging applications will ensure that long-term needs won't be compromised by short-sighted initial cost concerns.

Korostoff is president of Sage Research, Inc., a Natick, Mass.-based firm specializing in quantitative market research. She can be reached at kathryn@sageresearch.com.

Interop

Continued from page 1L

The 100Base-T module allows companies to connect servers and workgroup switches to an ATM backbone. The module features an onboard segmentation and reassembly chip that converts frames to ATM cells.

Bob Olsen, Agile's vice president of marketing, also hinted that the company

is developing a higher end switch that would increase the ATMizer's Ethernet and ATM port density. In addition, Agile plans to round out its product line later this spring with a smaller workgroup switch.

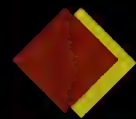
Scorpio's Stinger

Israeli ATM vendor Scorpio will unveil its Stinger-5 ATM backbone switch. The nonblocking 5G bit/sec switch supports

as many as 112 ATM ports at speeds up to 622Mbit/sec.

Unlike competing ATM switches that use a single switch fabric, Scorpio partitions the fabric into four 1.2G bit/sec slices. The distributed approach reduces costs by sharing a buffer pool among the output ports rather than dedicating a buffer to each port.

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Fibronics

NDS

Continued from page 1L

Services (NDS), according to Steve Markman, executive vice president and general manager of the Novell Products Group. The company is looking to make NDS a practical interenterprise directory for use on the Internet as well as a central repository from which intranet users can access net services using World-Wide Web

browsers, he said.

BrainShare attendees seemed to like what they saw at demos in which Markman distributed applications and displayed NDS information from a Web page using NDS, the NetWare Application Launcher, the NetWare Web Server and other products that are shipping or will ship soon.

The ability to give end users equipped with Web browsers access to network resources via NDS could streamline net-

work managers' jobs, said Ken Ivey, system analyst for the School of Health Related Professions at the University of Mississippi Medical Center.

"I could allow users to find [any type of network service] without having to call an administrator first," Ivey said. That ability would save time and money, he said.

The intranet strategy is a move in the right direction for Novell, which is already shipping network products that would

NETWORK DIRECTORY SERVICES FUTURES

- ▶ Better management capabilities, including more fault-tolerant replication, SNMP support, auditing and an enhanced NDS Event System with error notification
- ▶ Open Schema Object to link directory trees with different schemas
- ▶ Catalog Services for NDS, which can cache directory data for quick access
- ▶ X.500 data and security synchronization

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make building and operating intranets easier, said Martin Urwaleck of Austrian reseller LANSysteme.

"Novell is the only company in the market that has a vision that makes sense to me," he said. "Microsoft implements Microsoft-only solutions; that's not the way I do business."

NDS enhancements

In addition to the Internet ties, Novell is working on a host of enhancements designed to make NDS more powerful and flexible in any environment.

Although Novell officials are reluctant to give ship dates, the firm is working on several NDS features that will be available probably in the next 12 to 18 months.

One of the most useful features for linking separate organi-

"Novell is the only company in the market that has a vision that makes sense to me," Martin Urwaleck said.

zations across public or private intranets will be the Open Schema Object, said Dave Eckert, technology manager for NDS at Novell. This is a new object type within NDS that can encapsulate a segment of an NDS tree. The idea, Eckert said, is to let two organizations with completely different NDS tree designs link their directories without forcing them to convert to the same NDS schema.

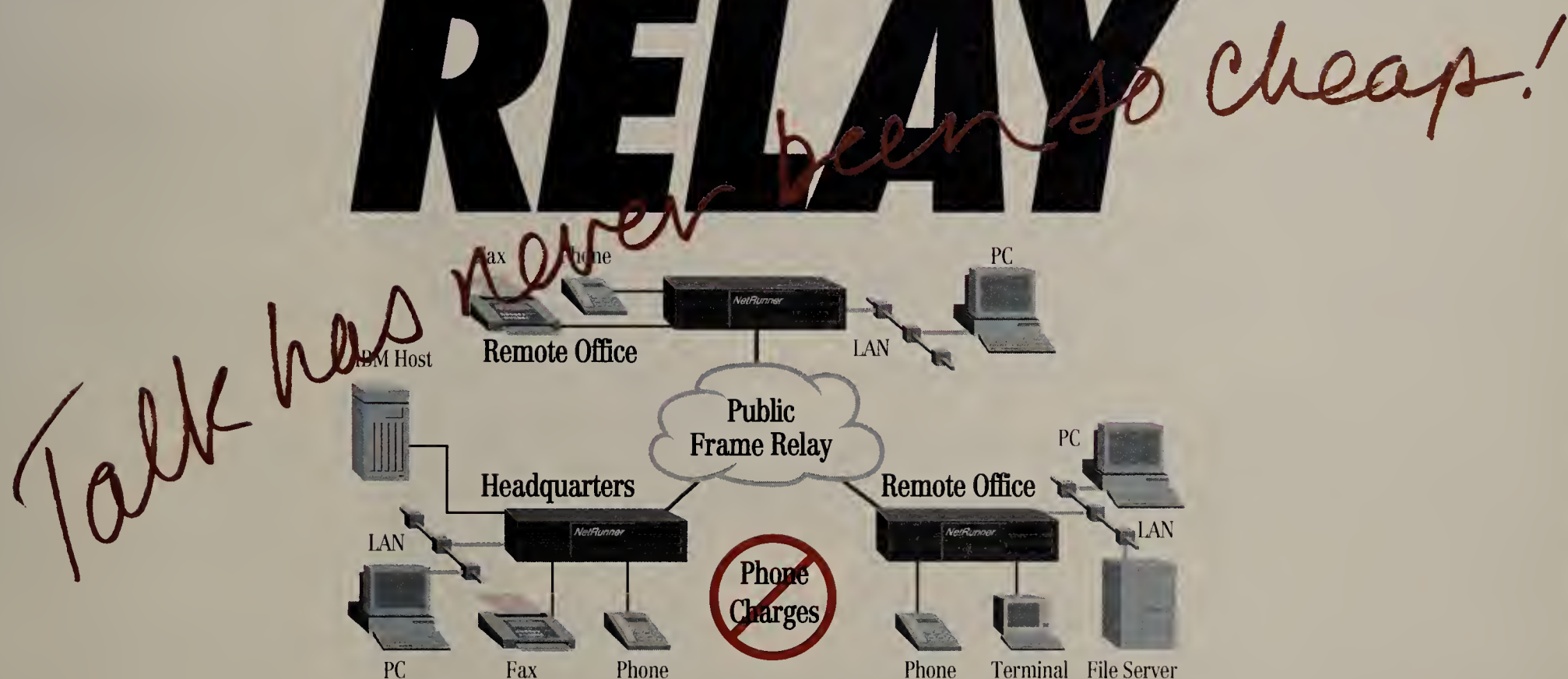
To connect two directories, net managers would encapsulate one NDS tree segment in an Open Schema Object and put that object within the other organization's directory. Users in the second organization could access information in the object, which would become a legitimate part of an NDS tree, even though the information within the object does not conform to the second organization's schema, Eckert said.

The new object type would also let separate divisions within a corporation use different NDS schema but still remain part of the same tree.

In addition, Novell is working on an improved Access Control List function that will let net managers create low-level administrators with rights to control printers or give out passwords, without giving them rights to change the NDS tree itself, Eckert said.

Novell is also working on a "secret store" for NDS, which would contain logon data and passwords for several applications or operating systems, giving users a single logon across heterogeneous nets, for multiple applications, he said. ■

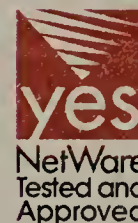
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Circle Reader Service #5

Network General sniffs out 'Net traffic

By Ben Haskett
Menlo Park, Calif.

Network General Corp. will introduce a new edition of its Expert Sniffer next week that can analyze database and Internet traffic and its impact on corporate nets.

Version 5.0 of Expert Sniffer is a hardware/software offering that can monitor

network traffic generated by users of Oracle Corp. and Sybase, Inc. databases. It also features a HyperText Transfer Protocol (HTTP) module that will let companies analyze World-Wide Web traffic. The Internet explosion has made gauging network traffic patterns trickier than ever, users said.

George Sweigert, network services manager at In Focus Systems, Inc. in Wilsonville, Ore., said his company's TCP/IP network traffic has grown a bewildering 18-fold in the past six months.

The new Expert Sniffer HTTP module could help find where Internet usage is creating bottlenecks and how it is affecting the overall performance of the network, he said.

Version 5.0 will also feature new FDDI

and Fast Ethernet modules for isolating problems on individual network segments.

Expert Sniffer 5.0 will be introduced at NetWorld+Interop this week and made available in June. Boards and software are priced at \$9,995 for Ethernet or token ring, and \$14,995 for FDDI, Fast Ethernet and WAN interfaces.

©Network General: (800) 764-3337.

Sniffer 5.0 highlights

- Includes modules for Oracle and Sybase databases that monitor software and hardware performance for networked databases.
- Decodes HTTP information packets to determine the impact of the Web on network traffic.
- Boasts a new filtering capability for FDDI and Fast Ethernet that focuses on specific network segments and end users.
- Supports NetWare Directory Services and Banyan VINES nets.
- Detects common packet routing problems and provides analysis through the Routing Information Protocol 1.0.

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NetWizard plays with 32-bit magic

By Ben Haskett
Bellevue, Wash.

Attachmate Corp. last week announced Version 3.0 of NetWizard, its software management tool set, which supports the 32-bit modes of Microsoft Corp.'s Windows 95 and NT.

Meanwhile, Software Artistry, Inc. has released an update to its help desk software that can see configuration changes through to completion.

By moving NetWizard to 32 bits, the software can automate the distribution of Windows 95 applications. It also supports Windows 95's long file names and new registry features, which contain configuration information.

NetWizard 3.0, a client- and server-based set of tools, is available now for \$595 for a 10-user license. A 1,000-user license costs \$38,995.

Software Artistry evolves

Software Artistry aims to aid help desk managers with Expert Evolution, a new component to its Expertise suite of enterprise help desk products.

Expert Evolution lets you access multiple screens of information about system problems. It also allows an administrator to see the effects of that change, even offering an impact analysis on the change. The software also can be configured to follow the operating practices of a business's IS department.

Expert Evolution is available now for \$20,000 for the server component of the software and \$3,500 for each additional concurrent user. The software supports OS/2, Windows 3.1, Windows 95 and Windows NT.

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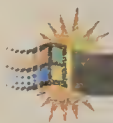
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Circle Reader Service #4



WIRED WINDOWS

Dave Kearns



The right way to choose a NOS

A number of years ago, the E & J Gallo winery ran a series of advertisements for one of their white wines, calling it "America's best-loved Chablis." In fact, what the company meant was that it was the best-selling Chablis. While I frequently drank the Gallo product, I would much rather have had a

French Grand Cru or Premier Cru Chablis on my table—if only I could afford it.

What's all this got to do with networking? Recently, both Microsoft Corp. and Novell, Inc. have taken to assaulting us with numbers, trying to prove whose network operating system (NOS) is better by virtue of having the top sales position.

Novell rightly claims to have the world's largest installed base of servers and nodes. Additionally, the company says NetWare 4.1 is currently the best-selling NOS.

Microsoft crow's about 100% growth rates and claims that NT Server will outsell NetWare 4.1 by June. IBM recently chimed in that there are more OS/2-based servers installed than NT servers.

What's it all mean to you? If your sole criteria for deciding on your next NOS purchase is its sales volume, then you'll have to sift through the reports, weigh the sources and compute nodes vs. servers vs. dollar volume.

If that's your criteria, though, to be consistent, you'd also need to choose either Windows Write or WordPad as your corporate word processor since the installed base is larger than Microsoft Word and WordPerfect combined.

"Ah," you say, "but neither Write nor WordPad have the features I need and my users want." Very true. And it's just as important to remember that when deciding on a NOS. So how should you decide?

First, get literature describing the features of a number of different NOSes. Combine the features into a list, then decide which of those features you need which you'd like and which you don't want. Now take this list and compare it to the features offered by each NOS. Add in the cost of purchasing, installing and supporting third-party applications to give you a feature not included in the NOS.

Each of the major NOSes, with appropriate third-party add-ons, will provide the network technology you need, but it's good to understand the total cost involved. Something to watch for are features included with the NOS that you don't want.

While most major NOSes include at least rudimentary backup systems, for example, many administrators need something more robust and purchase

MORE than surfers; satisfied users.



"Your online version of *Network World* is **fabulous**. The articles are timely and informative, and your design is **stellar**. The hyperlinks and story links are a great idea. Well done!"

— Tom Shaheen
University of Michigan

"Just started using your site and the ease of access and importance of content is **excellent**. I have been reading *Network World* for years and it has helped in network decision making. Keep up the good work."

— Gary Von Erden
Cable & Wireless, Inc.

"I have been looking around your new Web site and I must say it is one of the **best** I have seen to date. You provide links to documents and stories with a complete set of other references. All of the articles are well written and fully researched."

— Claude A. French III
MIT Lincoln Laboratory

"I wanted to say how impressed I am with the *Network World* Fusion Web site. I really appreciate the way related links are pulled together under a topic. To me, that **adds value**. I hope you will continue to provide more of this organized information. I will make this Web site my primary source for network-related topics."

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Tip of the week

Farallon Computing, Inc. has released a free beta evaluation copy of its Windows 95-based Look@Me product, which works as a Netscape plug-in for remote access to another Look@Me user, or for a Macintosh or PC running Farallon's Timbuktu. Get your copy via the Web at <http://collaborate.farallon.com/www/look/look@.exe>.

third-party archival solutions.

More difficult is deciding if there are any NOS features or functions that you need to remove or disable, such as Service Advertising Protocol on a large NetWare intranet. You're going to have to calculate a cost for that also.

When you're done with this exercise not only will you have a better idea of your wants and needs, but you'll also be able to base your purchase on the merits of the product—not such nebulous concepts as what's the world's best-loved NOS.

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at dkearns@msn.com.

NET RESULTS

Virtual LANs: Nightmare or nirvana?

It was just about a year ago when we first used our column to visit the practicality and feasibility of deploying virtual LAN technology in production-level networks.

At that time, we strongly cautioned users against aggressive implementation of VLANs for several reasons.

A year later, we believe there are inherent risks in VLAN implementations that are neither being discussed nor dealt with in vendor offerings — and, sadly, for many of the same reasons we cited a year ago.

The industry still hasn't embraced a common definition for what a VLAN is, so we offer this framework for discussion: A VLAN is a broadcast domain similar to an IP subnetwork, an IPX network, an AppleTalk zone or a DECnet area.

The significant difference is that a VLAN does not have the physical constraints of a subnetwork. VLANs use protocol addressing to determine which workstations comprise specific groups. Those groups can be spread anywhere on the network. The impact of this is fourfold:

■ **"Local" becomes a meaningless term.** Intra-subnetwork communication must now happen over the network backbone, where once it stayed in one physical workgroup. This change in dynamics can potentially flood a backbone with traffic, making communications both problematic and intermittent.

■ **Extra overhead and protocols.** By allowing workstations to be located anywhere on the physical network, vendors must establish features that will allow protocol stacks and algorithms to function in a way that violates many protocol rules. A VLAN is, basically, a breached or split subnetwork to a traditional protocol stack.

■ **The need to plan in a dynamic environment.** While a chief benefit of VLANs is that they eliminate the need to physically move around network resources, the logical movement of endstations and resources on a regular basis can cause network traffic patterns to change unpredictably. This dynamic traffic model breaks down common LAN planning and upgrade practices because bandwidth to the workgroup and the backbone becomes a moving target. The only effective means to accommodate an endlessly changing traffic model is to provide as much bandwidth as is physically possible to all locations and hope that it is enough.

■ **Proprietary virtual LANs.** VLAN implementations are highly proprietary, requiring specialized protocols to uncouple the physical and logical location of devices throughout the network. There is no

interoperability in sight for the next few years. VLANs inside of one physical device are not so much an issue, but VLANs that span the campus backbone can lead to a single-vendor solution for all hubs, switches and routers.

Without control and proper planning, VLANs can be a nightmare. Users planning to implement them should look at the impact on their existing networks. If the VLAN functionality is critical, evaluate the costs and changes that are necessary to implement VLANs from each potential vendor. The cost of the implementation could easily outweigh any benefits. To contain support issues, users should restrict the number of split subnet-

works and the ongoing changes. In this way, some degree of planning, management and overhead can be accommodated.

Le Baron is a research director and MacAskill a senior research analyst in Gartner Group, Inc.'s Network Computing Infrastructure group. They can be reached by E-mail at inquiry@gartner.com or by phone at (203) 316-1111.



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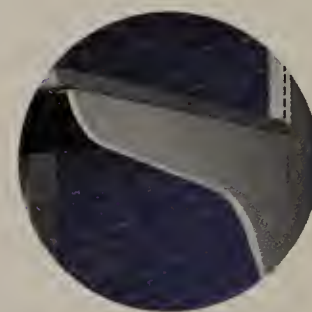
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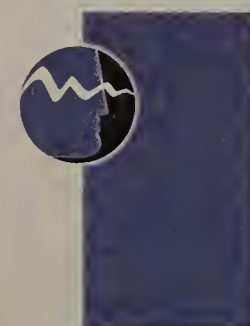


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Briefs

■ **PictureTel Corp.** of Danvers, Mass., this week will unveil a new software release for its **desktop videoconferencing** systems, along with a new camera option for its entry-level PictureTel Live50 systems. For both the Live50 and higher end Live100, the Release 1.6 software now runs on Windows 95 PCs. It adds V.35, RS-449 and Switched 56K bit/sec connectivity to the Live50, along with an option to run at data rates up to 384K bit/sec. The software is available now and is priced at \$2,495 for the Live50 and \$4,995 for the Live100.

PictureTel: (508) 762-5000.

■ **Applied Parallel Technologies, Inc. (APT)** in Boston has announced *Orchestrate*, a C++ development environment for building large-scale **parallel applications** for IBM's RS/6000 Scalable Powerparallel (SP) servers. The software framework and class libraries automatically handle much of the work in moving data to the SP server, distributing it over multiple processors and managing all communications.

Until now, programmers had to work with low-level operating system APIs and interprocess communications to do this work. *Orchestrate* is now in beta test and will be released around June. Pricing is not yet finalized.

APT: (617) 494-1177.

■ **ParcPlace-Digitalk, Inc.** of Sunnyvale, Calif., has released *VisualWave Server*, which is **Internet server software** that hosts applications built with the company's Smalltalk-based *VisualWave Development Environment* tool set. *VisualWave Server* works with various Web servers to provide facilities for such things as managing and configuring applications, session management and performance tuning. *VisualWave Server* runs on Windows NT and various Unix platforms. The development tool set starts at \$4,995.

ParcPlace: (800) 759-7272.

Motorola unit builds distributed warehouse

By Barb Cole

Tempe, Ariz.

A division of Motorola, Inc. here has built a data warehouse that provides the benefits of both distributed data marts and a centralized data store.

The warehouse, which contains product and financial information, lets about 400 users analyze the efficiency of several manufacturing facilities and better manage order fulfillment.

The contents of the data warehouse are divided into nine Oracle Corp. database servers, with information most often accessed by end users kept on the servers closest to them.

Key to the warehouse is a centrally updated repository that contains information about what data exists and where it is housed. The metadata repository is accessible locally by any end user, and can be used to locate and access information stored in the nine databases.

"As a result of the warehouse, we are able to measure the performance of our manufacturing plants in a consistent way," said Barbara Martensen, vice president and director of information systems for the data warehouse sector at Motorola. "We're also using [the warehouse] to improve quality and deliver products in a more timely way."

The data warehouse sites, spread across the U.S., Europe and Tokyo, are connected via a mix of T-1, 512K bit/sec and 256K bit/sec lines.

The warehouse is based on a global database format that gives it a common look and feel. End users also have access to a library of queries and formatted reports.

Motorola loads about 2G bytes of data from legacy mainframes and minicomputers into the warehouse each day. At the end of each month, about 20G bytes of additional data is loaded, then the distributed database servers are updated.

When end users locate information through the metadata repository, the data is replicated either to their desktops via File Transfer Protocol, electronic mail or HTML, or to their local data warehouse node.

Although the Oracle data-

bases include built-in replication, most of Motorola's data replication schemes were hand-coded in C and C++. The replication available within Oracle is best suited for planned updates, not the ad-hoc replication schemes employed in Motorola's warehouse, the architects of the system said.

Because data is organized so that most of the information users want is on their local warehouse database, the warehouse has not generated a lot of extra traffic on the company's backbone net, Martensen said.

In addition, the administrators monitor queries using custom-developed software and will move data to a user's local data warehouse if it is being accessed frequently, she said. ■

Imaging show touts standards work, new suites

By Barb Cole

Chicago

Emerging interoperability standards and product suites combining workflow, imaging and document management technologies will take center stage at the Association for Information and Image Management (AIIM) '96 conference here this week.

The image processing association will host a multivendor demonstration of a document management standard developed by the Document Management Alliance (DMA), an AIIM subset formed at last year's conference. The DMA standard will let users share information across disparate document management systems and is expected to be published this fall.

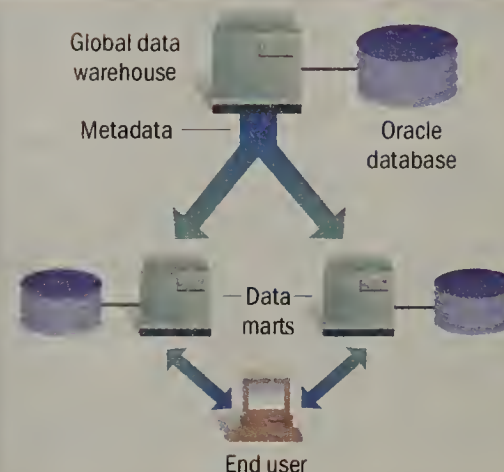
Separately, the Workflow Management Coalition, a consortium of vendors and users, will talk up its new specification defining how workflow systems can share data. The spec is closely aligned with Microsoft Corp.'s Messaging API Workflow Framework.

In addition to demonstra-

See AIIM, page 56

Motorola's distributed warehouse architecture

One database designated as the global data warehouse regularly updates a metadata repository, which copies the information to data marts around the world via various speed WAN links. The system provides end users with the information they need most often at their local data mart, but also enables them to locate and access data on other data marts across the network.



Tools vendors marrying the Web with existing applications

By John Cox

A Web page is just a Web page. But if you connect it with existing corporate applications, you can do more than just look at it.

That's why application development tool vendors such as the ones that follow are creating interfaces intended to marry Web browser and HTML pages with applications and data on

corporate nets:

■ **Bluestone, Inc.** of Mount Laurel, N.J., this month will release *Sapphire/Web 1.1*, a visual development tool set that lets developers marry a graphical Web interface with corporate databases. The tool set works with various HTML editors and other development tools. See Web tools, page 49

Making Web connections

Vendor	Product	Description	Price	Availability
Bluestone	Sapphire/Web 1.1	Create HTML files that can be linked with databases	\$2,995 (includes 1 year of support)	This month
Forte	Forte Web SDK 1.0	HTML class libraries, plus fast CGI link Web clients with Forte-built programs	Not available	By June
	SDK 2.0	Java interface to Forte-built programs	Not available	Later in 1996
Sterling Software Desktop Integration Division	Star:View	Automatically converts 3270 datastreams to HTML	\$1,995 for 10 users	September
	Star:Gate	Builds and links Web browser-based applications with server databases and programs	\$5,995 for tool set; \$2,995 per 10 users for deployment	1997
TI Software	WebCenter	Links server programs built with TI's Composer to Web servers	About \$3,000	This month
Uniface	Web Enabler	Links Web servers with Uniface-built server programs	Not available	Second half of 1996

Cadre, Bachman form Cayenne, adding spice to the tools market

By John Cox

Burlington, Mass.

The future of object-oriented distributed applications is...red pepper. At least that's what the people at Cayenne Soft-

ware, Inc. are hoping.

Cayenne was launched last week with the inking of a merger agreement between Bachman Information Systems, Inc. and Cadre Technologies, Inc. The

new company, with combined revenues of about \$70 million, will focus on application design and development tools for programming teams.

Cayenne also announced the first product under its own label: ObjectTeam Enterprise. ObjectTeam is basically a new release of Cadre's repository-based C++ tools and code generator.

The release, due by June, adds generators for Java, SmallTalk and the interface

definition language defined for the Common Object Request Broker Architecture. It will also generate code for an array of development tools, such as PowerBuilder and Visual Basic. Besides the Unix platforms, the new version will support Windows 95 and Windows NT clients and servers.

Bachman's product line includes data modeling and database design products. Cadre traditionally has focused on tools for structured programming analysis and design as well as for rapidly building prototype applications. That focus has widened, however, to include tools for automating object-oriented design methodologies and creating reusable software components.

Shareholder approval for the merger is expected this month.

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Cadre Technologies

Analysis and design tools for structured and object-oriented programming



Cayenne Software

A \$70 million company focused on delivering tools for designing, analyzing and constructing component-based distributed applications

BusinessBriefs

Microsoft Corp. last week said that **The Boeing Co.** plans to use Microsoft Exchange Server as its primary messaging and workgroup server for 65,000 of its employees around the world. Boeing said Exchange Server will replace more than seven legacy electronic mail systems. The rollout is expected to be completed in 1997.

Document management maker **Information Dimensions, Inc.** last week named Bill Forquer, a 15-year veteran of the document management industry, as president and chief executive officer. Forquer, who has been with the company for nine years, was previously vice president of marketing.

Allen Brown, vice president and chief technology officer at **Xsoft**, the document management arm of Xerox Corp., has received a patent for key technology in the company's Astoria document management software. The technology protected by the patent defines a new method of executing the layouts of structured documents more efficiently than in the current system.

Sun Microsystems, Inc.'s **JavaSoft** group next month will sponsor **JavaOne**, a conference for Java developers. The show will be held May 29-31 at San Francisco's Moscone Center. Sessions will be held on the topics of technology, business and design. For more information, call (800) 488-2883.

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4

Bringing order to
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3

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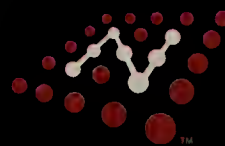
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A solid foundation for
the future

13

NetWare 4, NDS and
partner solutions

19



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S U P P L Y I N G T H E D E M A N D I N G

Bringing order to
your network.

Views from
Novell.

THESE days, information in the workplace is as likely to be digital as hardbound, and that fact is significantly enhancing productivity in the mailroom, the corner office and nearly everywhere in between. Distributed networks that convey digital information everywhere can

provide tremendous competitive advantages today—NetWare® 4 with Novell Directory Services™ (NDS™) is a prime example. But what about tomorrow?

There are many first-rate engineers and other visionaries at Novell® who are always happy to express their opinions about almost anything—but especially NDS and NetWare and their impact now and in the future. Here, very briefly, are the views of four of them.

Peter Clegg, Technical Marketing Manager, NetWare Products Division

Something fundamental about networks is that they have to be inclusive. NDS on NetWare lets you access, control and manage ALL of your network resources. This includes applications (desktop, database), peripherals (printers, fax servers,





BRINGING ORDER TO YOUR NETWORK

communications servers), organizations (users, groups), connections (hubs, routers, Internet), and computers (workstations and servers). Every network resource now and in the future will be accessed and managed through directory services.

For today's networks, this means simpler and more powerful network management capabilities. It means less expensive administration costs. And it means building on a foundation that will grow with any size or type of organization.

For networks in the near future, NDS will facilitate intercompany communication and information exchange. Connecting many companies and their resources together through the Internet and services such as AT&T NetWare Connect Service™ will enhance communication between manufacturers and suppliers, services and clients, and producers and users.

Cyberspace is here and NDS is mapping it.

Sam D'Stasio, Product Marketing Manager, NetWare Products Division

One of the most compelling stories to tell with NDS is the value that it brings even without NDS-aware applications. The key goal of information systems in the future has to be that the systems are able to do the work themselves. One of the reasons that most surveys of client-server computing show that the costs are greater than host-based systems is the tremendous overhead of managing the network.

The great thing about NDS is that it can learn and automate mundane

tasks. One of the most annoying things to a network administrator is the overall impression in many companies

Today's networks must be simpler, more powerful and less expensive. That's what NetWare 4 is all about.

that their departments are financial drains. The reason this too often rings true is because of the tremendous overhead of workaday network tasks (adding users and inputting changes, moves, and so on); the network administrator is never able to complete the "project list" fast enough. The real value of the network is the ability for it to provide a competitive advantage. The user benefits greatly because of the availability of tools like the NetWare Application Manager™ (NAM™) and the fact that applications are free of support issues and can be deployed on schedule to better assist users.

NetWare 4 and NDS solve this problem and better align the support infrastructure with the application developers. The IS team can better serve the needs and align itself more efficiently with the company's business goals. Which, after all, is the reason information technology exists at all.

Jason Werner, Technical Reviews Manager, NetWare Products Division

IS managers get it right these days by picking and choosing the right solutions for their needs. Novell's philosophy on interoperability is to partner with leading hardware and software vendors to offer customers

solutions that provide interoperability within their network infrastructure. NetWare 4.1 provides the foundation that lets you pick and choose the right solutions by adherence to industry standards, by partnering with the leading hardware and software vendors, and by providing software integration with NDS, which allows easy management from a single point. Novell also has a huge third-party channel with numerous NetWare providers and technical consultants that allow customers to choose the partner that works best for them.

DeeAnne Higley, Senior Software Engineer, NetWare Products Division

As one of the engineers working on Novell Directory Services for the past few years, I am pleased at the level of flexibility we have been able to achieve. Today's IS manager requires a system that cannot only meet the current business needs, but can adapt to the changes which will occur in the future. The ability to extend the NDS schema and add new information to the directory, to move branches and merge trees, or to distribute administrative control allows the network to meet the needs of the company rather than the company force-fitting itself into the limitations of the product.

The flexibility of NDS can be demonstrated by its ability to actually store "intelligence" in the directory. The NAM is the first example of ways in which Novell will provide new functionality—changing the way people work. The technologies we are developing today, for tomorrow's products, will allow dramatic improvements in productivity. ■

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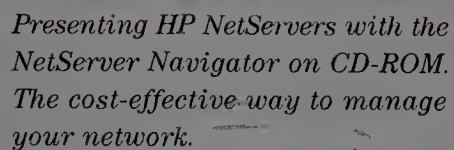
authoring, publishing and navigating, including Netscape Navigator 2.0, which allows you to download Java applets.

The Caldera Network Desktop is also a NetWare client with full NDS support, and it provides client and server access to Windows for Workgroups, NT, and 95, and all existing UNIX networks. It has a graphical X Window System, and will also run DOS and Intel UNIX applications.

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{ Set your sights
on NetWare 4.1. }

The right tool
for administering
your network.



NETWORKS have become common-
place in enterprises these days.
They are as much a part of doing
business as crunching numbers,
paying exorbitant taxes and
drinking bad coffee. And yet,
familiar as they are, no company
can afford to take them for granted.

Networks can confer tremendous competitive advantages, but only if they are well-suited to the specific environment within which they operate. NetWare 4 is flexible and scalable so that its functionality can be tailored to any size business. It requires minimal training for users and administrators. And enterprises of all kinds stand to gain from its benefits, as you will see in the following sections.

Single point of administration and control

NetWare 4 and NDS assist Teck Corona Operating Corporation at its gold mine in Northwestern Ontario. The company extracts 3 to 4 thousand ounces of the precious metal per week, and IS management is an important part of the process. Network manager Gary Kajutis is presently upgrading a NetWare 3.11 server to



THE RIGHT TOOL FOR ADMINISTERING YOUR NETWORK

NetWare 4 and is considering adding multiple departmental servers next year. His system encompasses a server plus six Ethernet segments, approximately 40 DOS and Windows PCs, eight printers, two plotters and a gateway to a remote AS/400. So far, Gary is probably most impressed with the new ease of administration he's found.

"NetWare 4 is a breeze to install," he said. "I love CD-ROM installation, the Client 32 for Win95 is beautiful, and NWAdmin is an incredible timesaver."

NWAdmin™ (NetWare Administrator™) acts as a central management point for all the information stored in the NDS directory. Through a point-and-click user interface and an extensible snap-in architecture, an administrator can browse and manipulate directory objects, including application objects, user profiles, printers, file system objects and many others. The Win95 Client is a 32-bit version of NWAdmin. It lets network managers benefit from performance increases of up to 30 percent over the existing 16-bit version when performing tasks such as directory searches and file listings.

Gary is also excited about NetWare Application Manager (NAM), because he is replacing DOS with Windows 95. NAM will enable him to set up a script and automatically install the new software.

Teck Corona's parent company, Home Stake Ltd., owns another gold mine just down the road, and Gary expects to integrate the systems and use NDS to administer networks at both mines from a single point in the near future. That way, if the network manager at one site is out of the

office, it's no problem. From an administrative standpoint, according to Gary, "it would be perfect."

Single point of access/login

One login with one password allows users to view and access network resources without logging in separately to each server. This makes NetWare 4 extremely user friendly and increases productivity. Users access the entire network as if they were pulling up files from their own hard drive or sending communications down the hall even if it's really across the country or around the world. And the help desk isn't hounded by people who have forgotten various passwords or the address of a server.

McGill University in Montreal is a case in point. Its fiber-optic backbone links over 80 university buildings

time-consuming and frustrating. But with NetWare 4, users only have to log in once to the network and key in a single password to have access to all authorized resources no matter where they are located on the network.

"We're very excited about NetWare 4's capabilities," said Lisa Laing, Network Systems Analyst for McGill. "We look forward to going campus-wide with NetWare 4."

Seamless integration of all network components

For Tour Ice National, Inc., the benefits of NetWare 4 and NDS are crystal clear: a single point of access for both management and troubleshooting, easy remote access for branch offices and traveling staff engineers, and simple mapping of all network resources. The company designs and manufactures ice and cold storage facilities and the occasional ice rink, while selling all kinds of ice-related equipment. Headquartered in Colorado Springs, Tour Ice National has a manufacturing subsidiary in San Antonio as well as sales

offices in Houston and Jacksonville. Tour Ice National's IS operation consists of a NetWare server and 17 PCs in Colorado Springs; remote users, including "road engineers" with laptop PCs, maintain dial-up access to the network.

According to Eric Gordon, director of IS, the combination of NetWare 4, NDS and support software allows for outstanding information access, integration and control. "We came out of a mainframe environment

The benefits of NetWare 4 and NDS are crystal clear: single point access and simple mapping of all network resources.

with major Montreal hospitals. The backbone connects 120 servers running NetWare to 4,000 PCs, 500 Macintosh personal computers, 500 UNIX machines including many large servers, two IBM 3090s and one IBM 9370. Because some resources were split between two or more servers, users had to remember where their resources were located and the different passwords needed to access the resources. In addition, logging in and out of several servers was

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THE RIGHT TOOL FOR ADMINISTERING YOUR NETWORK

where nobody had information," he said. "But now, with NetWare 4 we can make the most of multiuser

accounting and engineering software. Our users can all access CAD files, work authorizations, purchase

orders, scheduling information—anything they need, anywhere they might be." ■

Directory services verses name services

NetWare 4.1 uses a true hierarchical directory service called Novell Directory Services (NDS), while Microsoft's Windows NT Server only utilizes a flat database name service it refers to as a directory. The differences between the two are significant.

NDS provides network users and administrators with full transparent access to all network resources—users, groups, printers, servers and other physical network devices—throughout the entire network. Windows NT Server's name service only provides simple mapping of network names to addresses only. It doesn't possess true directory capabilities such as location independence and extensive querying and searching capabilities, which means users must log in separately to each server and resource.

NDS is organized in a single hierarchical

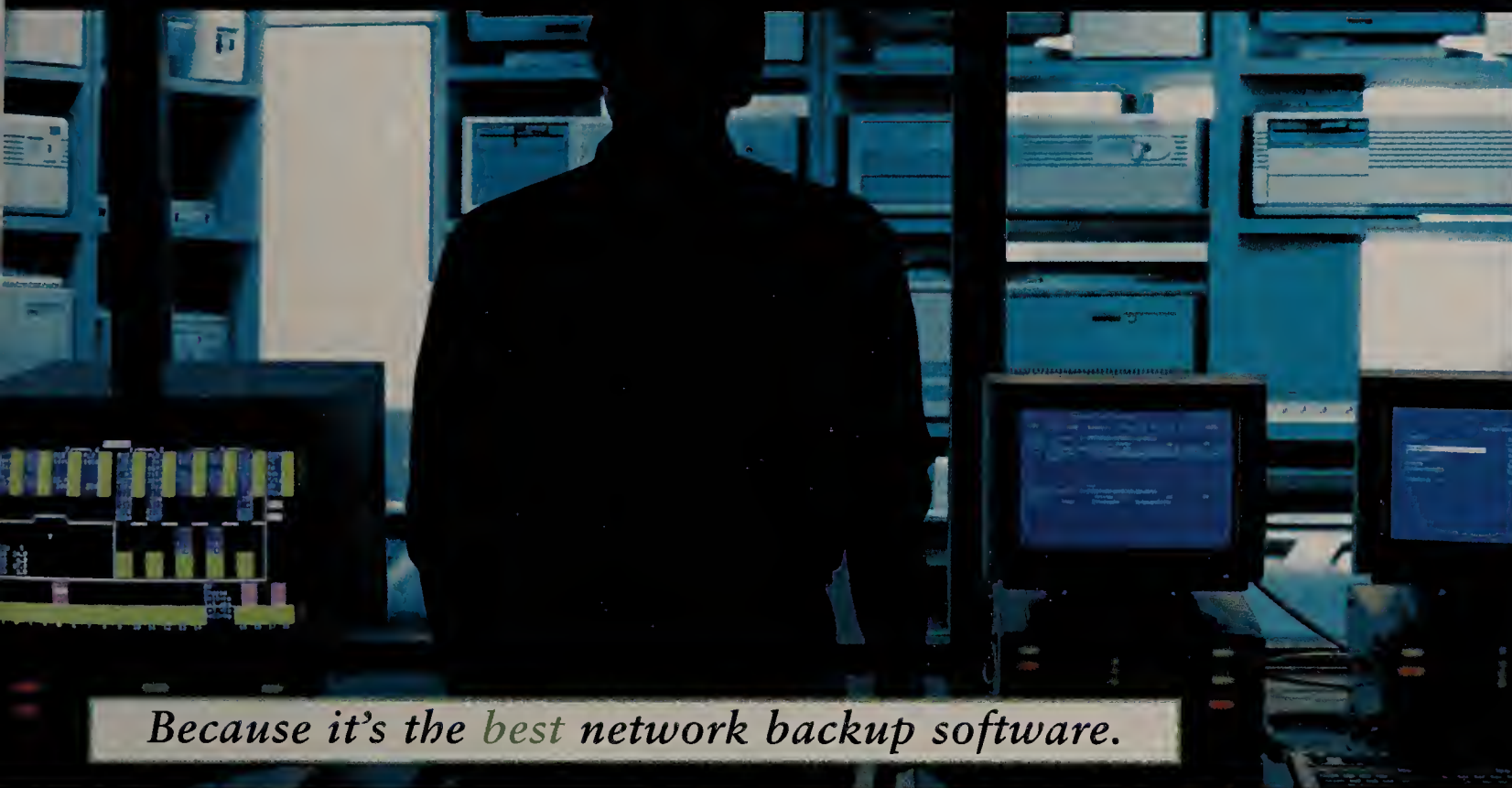
structure known as a directory tree, which can store a wide range of information about every resource on the network. The directory tree can be easily implemented and modified from a single location, regardless of the network's size. NDS can combine E-mail, voice mail, personnel data and network databases into one easy-to-use and manage directory system. These applications can access the NDS database and use the information, which simplifies management because you maintain only one database for all these applications.

The Windows NT Server name service uses less advanced domains and a flat naming structure similar to the bindery in earlier versions of NetWare. To provide users with single login and global access to network resources, as found in NDS, trust relationships must be established manually between every domain on the network—a task that becomes extremely cumbersome no matter what the network size.

NOVELL DIRECTORY SERVICES VS. MICROSOFT NAME SERVICES

Feature	Novell Directory Services	Name Services
Single login to network	Yes	Limited
Single login to services	Yes	Limited
Location-independent login	Yes	No
X.500 interoperability	Yes	No
Scalability	Yes	Limited
Partitioned database	Yes	No
Extensible database	Yes	No
Single point of administration	Yes	Limited
Moving a user account	Drag and drop	Delete and recreate
Planning a workgroup-based network	Simple	Difficult
Fault tolerant	Yes	Limited
Mobile user support	Yes	Limited
Flexible	Yes	No

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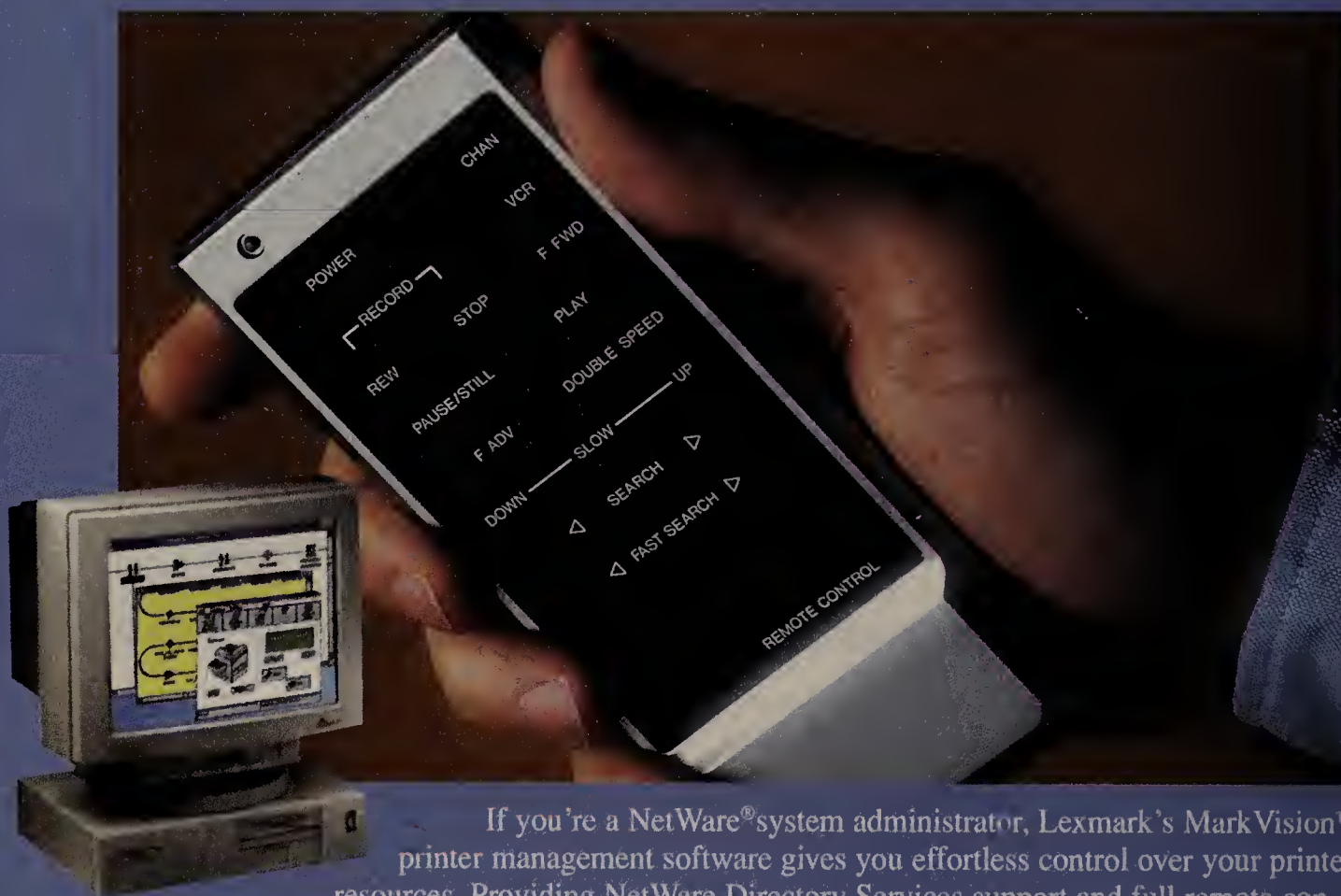
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- ☐ ON Technology/IP-Track
- ☐ Seagate Software
- ☐ Stac/Replica

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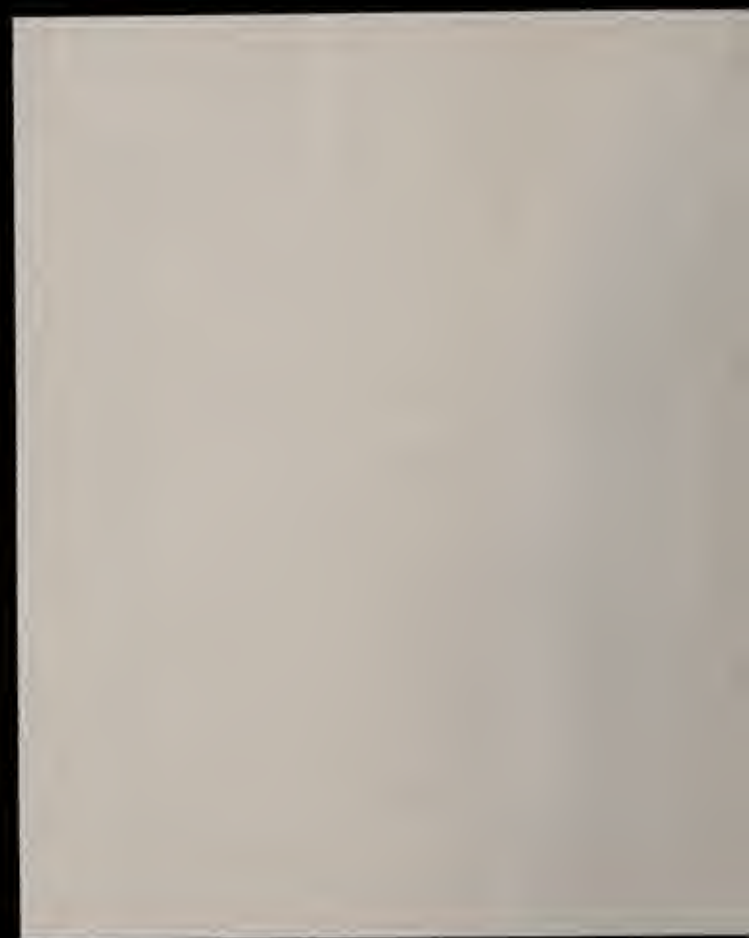
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{ NetWare 4 } →

A solid foundation
on which to build the
networks of the future.



IN 1995, NetWare 4 surpassed NetWare 3 as the best-selling network operating system (NOS) in the world. In spite of intense marketing hype from Microsoft, IBM and others, one has to wonder how NetWare holds a 64% market share. Also, why are IS managers

planning to increase their NOS installed base with NetWare 4 by 258% in 1996 compared to 55% for Windows NT?* Why the mass migration to NetWare 4?

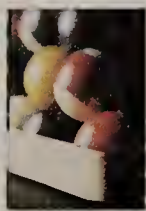
Well, as in all computer-related matters, you ask a few simple questions and get elaborate, multi-dimensional answers.

The fact is, NetWare 4 is by far the most advanced, most scalable network operating system; some would say the only true NOS in the running. It offers customers the latest in directory, security and management services. But there's much more. According to the IDC research study, IS managers consistently responded that six key issues were critical when evaluating and selecting network or server operating systems. Let's examine these issues in some detail.

Facilitating network expansion and upgrades

NetWare 4 is ideal for network managers concerned with building a lasting

* Figures derived from "Cost-to-Use: Novell NetWare 4: a 1995 white paper based on survey of IS managers in 150 companies conducted by International Data Corporation (IDC) with sponsorship from Novell.



A SOLID FOUNDATION ON WHICH TO BUILD THE NETWORKS OF THE FUTURE

network infrastructure. Novell is committed to backward compatibility as evidenced by the ease of integration of NetWare 3.x and NetWare 4. As for connecting to the future, the next major upgrade to NetWare, code-named "Green River," will add new functionality to NetWare 4 and will be completely backward compatible. NetWare 4 is architected to be scalable and can handle a small workgroup or a large, multinational workforce; it grows as your business grows. NetWare 4.1 also offers advanced processor options including symmetrical multiprocessing (SMP), and Green River will add PCI and multiple-bus support later this year. No other NOS offers more network expansion flexibility.

Novell Directory Services also facilitates network expansion by being a key integration point for all essential network services. For example, NDS provides a single directory for telephone, E-mail, network user ID, security, database and third-party applications. Users enjoy single login and simplified secure access to all network resources regardless of the number of servers; administration tasks are simplified through centralized control and integrated services management even on large internetworks spread out over numerous locations. And NDS will soon provide a single point of administration for network applications including E-mail, groupware and databases. Novell is also committed to using NDS as the directory foundation to manage Microsoft, HP, IBM and X.500 networks—all from a single location.

Supports heterogeneous clients/servers

Novell has consistently demonstrated its commitment to network computing

by leading the way in transparent, heterogeneous integration. NetWare 4 offers built-in support for Macintosh and IPX client protocols in addition to support for DOS, MS Windows, OS/2 and UNIX, to provide the richest cross-platform networking environments available today.

Novell is also the leader in providing multiprotocol network solutions over IPX, TCP/IP, AppleTalk and NLSP. NetWare 4 supports a variety of enhanced connectivity options, including NetWare for SAA for IBM host access, NetWare NFS for advanced UNIX services, NetWare for LAT (DEC access) and LAN WorkGroup™ for user access to TCP/IP-based network resources.

Supports increasingly sophisticated applications

Novell has been providing "special purpose application services" for over a decade, offering database integration with all of the leading databases including Oracle, Sybase, Btrieve and others. And now, Novell is revolutionizing networking and applications once again with the Net2000 initiative. Net2000 provides a stable set of interfaces and advanced tools that enable developers to easily create packaged network application products and allow users to customize their applications. Developers can also use Net2000 APIs to extend the functionality of NetWare core services—including NDS—throughout entire heterogeneous networks.

Another breakthrough in applications management is the Location Independent Networking that NetWare Application Manager (NAM) provides. By managing applications through

NDS, NAM makes it possible for administrators to enable, disable or upgrade applications on user desktops from a single location, anytime from anywhere.

Exploits advantages offered by emerging technologies like the Internet

Computer and telecommunications technologies are converging. It is now possible to build "smart global networks" that provide the high performance, easy access and low cost of NetWare 4, but without the overhead of building, maintaining and administering complex wide area networks or applications. They are smart because they use technologies such as NDS to educate the user about the network in addition to providing access to data, communications links and various network resources. And they will soon be as universal and easy to use as the telephone.

A key component of tomorrow's smart global networks is NetWare Connect Services™ (NCS™). Available today on a limited basis, NCS enables NetWare users, utilizing almost any kind of computer, to access global network services. Thanks to a strategic partnership with Novell, AT&T is now offering AT&T NetWare Connect Service (ANCS), which enables NetWare sites to connect their LANs securely to any other NetWare site, virtually anywhere in the world. Once connected, they operate together as one network.

Internet connections are also a seamless part of smart global networks, NCS and NetWare 4. Novell now offers the robust new NetWare Web Server™, which integrates with various NetWare services and NCS

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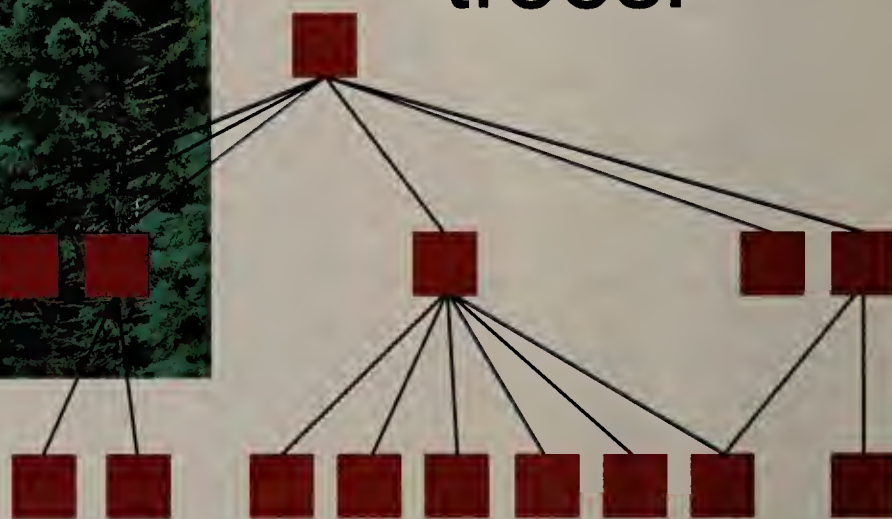


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for the most manageable Internet connection and Web publishing system available.

NCS can ultimately include mobile access to the network for individual users. For businesses, NCS provides reliability and security, around-the-clock service and support, and comprehensive online assistance.

Reduces network management costs

NetWare 4 helps you manage network growth through increased performance. In IDC's survey of 150 network managers, they indicate that they are increasing the average number of users per file server from 41.1 to

more than doubles disk capacity and adds multiple network services for tens, hundreds or even thousands of users per server.

Delivers scalable, feature-rich file and print services

As the file and print pioneer, NetWare offers the broadest and richest collection of such services, not to mention superior scalability and performance. In a PC Labs analysis of file server performance, the maximum throughput for each of the file servers with Windows NT Server 3.51 was less than half that of NetWare 3.12.** And, had they tested the NetWare 4

NOS alongside Windows NT Server, the differential would have been greater still. And, besides disk compression and disk block suballocation, NetWare 4 offers file system support for automatic hierarchical storage migration facilities for organizations that wish to support huge volumes of virtual, online

and near-line storage.

The number-one provider of TCP/IP software, Novell provides NetWare add-ons that allow UNIX clients to print to NetWare printers and vice versa. Popular add-ons are available for the SNA host world, too. NetWare 4 offers full support for AppleTalk printing protocols, including bi-directional communications and status information. Novell has also simplified and enhanced management of print queues, devices, forms and user access. With NDS, users can request print services easily based on printer capabilities rather than name and location. And performance is

second to none. With the release of Green River, NetWare Distributed Print Services™ (NDPS™) will really bring printers to life on the network by enabling two-way intelligent communication between users and printers.

Increasing Efficiency and Productivity

NetWare 4 is designed to help network administrators accomplish more with less. Because NetWare 4 and its core services are so extensible, they are fast becoming the foundation for a large number of innovative add-on applications from Novell and third-party vendors. What's more, Novell has made great strides to improve the cross-platform connectivity of NetWare with competitors' systems. Microsoft NT Server, for example. Novell offers three software components that provide key integration capabilities not only for linking NetWare 4 with NT Server, but with legacy LAN Manager and IBM's OS/2 LAN Server.

Integration is also the operative word for ManageWise™, a management suite codeveloped by Novell and Intel. ManageWise is an end-to-end management solution that keeps networks and applications available and running smoothly. Standards support for SNMP, TCP/IP, IPX and RMON allows easy integration of ManageWise information with third-party management consoles including HP's OpenView and IBM's NetView. According to IDC,† ManageWise provides a 50% decrease in network downtime and a 100% increase in remote management effectiveness.

GroupWise™, a workgroup E-mail and collaboration package from

Continued on page 22

"NetWare 4 has dramatically reduced our administrative workload. It's saving us time and money every day."

—Walter Dapp, Computer System Specialist

59.9 users per server. They also said they were growing their NetWare 4 networks by 258% but only planning to increase their file servers by 163%. The savings on server hardware alone will be substantial. And there are savings in many other areas.

By providing a single point of management, NDS can substantially reduce travel to remote offices, staffing requirements and costs. Moreover, because the NDS database can be replicated and distributed, NetWare 4 also supports multiple administrators simultaneously active in the database with full concurrency control. As for storage data efficiency, NetWare 4

** Source: "PC Labs Uncovers Server Software Surprise," Trends Online, January 30, 1996, ZDNet
† IDC ManageWise ROI Study, December 1995.

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who use them. You can't get maximum

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systems and the smartest people unless they
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See NetTUNE PRO at booth 2498 at Networld+Interop.



ahead of the competition, the extensibility, robust performance and remote accessibility of NetWare 4 enable enterprises to readily connect with their suppliers, customers and employees—wherever in the world they may be.

But perhaps the best reason of all to choose NetWare 4 is Novell Directory Services (NDS). It connects all network resources into one logical, hierarchical, easy-to-access and manage environment. A single login from any node on the network gives you a birdseye view of the entire network, plus management capabilities that save duplicated effort, time and money. With the object-oriented, distributed architecture of NDS, widespread multivendor enterprise networks become a single, cohesive information system. The clear benefit is enhanced user productivity and far fewer help desk calls.

NetWare 4 is the number-one selling network operating system, and NDS is fast becoming the directory services standard. It makes any network intelligent simply by recognizing the individual user, knowing what resources he or she typically needs, and linking that user to the appropriate information or services. NDS provides the user and/or administrator with access to the total network and establishes authentication information at login that can be used anytime thereafter to request and obtain resources.

NDS also keeps track of the entire network, securing and administering all objects including users, groups, resources and servers. Because NDS offers a distributed database that can be

replicated and partitioned, it is extraordinarily robust and fault-tolerant—and it guarantees directory accessibility from anywhere on the network, making the network as easy to design and maintain as it is for users to access.

Outstanding Extensibility and Customization

Application integration is another real benefit of NetWare 4 and NDS. As applications such as electronic mail, fax, telephony and document management become directory-enabled with NDS, they too can access a common directory—eliminating the need for multiple, redundant user listings. GroupWise is a good example. Thanks to NDS functionality, it consolidates E-mail, fax, voice mail, scheduling and pager messages into

**NetWare 4 provides
the dependable foundation
for networking, whether
in a small business or a
multinational corporation.**

one Universal In Box. GroupWise and NDS make a previously overwhelming stream of communications accessible to any NetWare 4 user from any desktop system, mobile computer or telephone. All it takes to add a user to GroupWise is the click of a button.

Partners' Solutions

Novell and its partners are delivering a new generation of network solutions that are making networks easier to use and administer and less expensive to own, operate and maintain. Novell is

working with more than 100 third-party vendors who believe in the power of NetWare 4 and are delivering NDS-integrated solutions. Here are just a few examples:

Cheyenne

Cheyenne's FAXserve 3.01 for NetWare is a network fax solution for Novell networks. Its NetWare Loadable Module™ (NLM™) architecture allows FAXserve to be an extension of NetWare rather than an isolated system. This close integration results in enhanced fax performance, easier installation and management, central monitoring, and disaster recovery. Another NDS-integrated application from Cheyenne is ARCserve 6.0. This disaster-recovery and data-management solution backs up the extended schema created by all NDS-compliant applications.

Hewlett-Packard

The combination of HP printers and NDS allows users to easily find the printers they need without logging in to several servers. Administrators can easily attach printers and control security anywhere on the network from a single console. HP JetDirect Print Servers designed for NetWare 4 connect printers directly to the network, bypassing the performance and distance limitations of printers attached to a file server or workstation, while providing all the performance and control advantages of a direct network connection.

ON Technology

SofTrack is an NLM that manages software license usage of server-based and workstation applications.



NETWARE 4 WITH NDS AND NOVELL PARTNERS

SofTrack guarantees license compliance and saves money by reporting the number of software licenses and upgrades a company has installed as well as the minimum number that is actually required. SofTrack features a five-minute installation and is the first cross-platform software-metering system for Windows, DOS, Macintosh and OS/2 that also features native NDS and SFT III™ support.

Oracle

Oracle 7.2 Workgroup Server and Enterprise Server are designed to optimize client-server performance by taking advantage of key architectural features of NetWare 4, including support for NDS. With Oracle 7 running on NetWare 4, network managers have a single point of administration as well as a substantially higher level of security. Users can access and update data anywhere in a distributed network with the same ease as if the data resided on a single, local machine.

Promoting Third-Party Solutions

Customers need to be able to choose the applications and systems that are right for their businesses.

Novell is clearly demonstrating its commitment to network computing customers and developers with the Net2000 initiative. A new strategy, Net2000 places Novell's robust services—including NDS—on other platforms such as UNIX, OS/2 and Windows NT Server. Net2000 provides a common API set that developers can use to write distributed heterogeneous networked applications. As new Novell services are made available, they will also be ported to other operating system platforms, and APIs will be added to the Net2000 architecture. Net2000 makes it much easier to build heterogeneous internetworks that run as if they were homogeneous. It enables network managers to take advantage of the best technologies while optimizing performance, ease of use and effective control of the network.

Preparing for a Network-Centric Future

We live in exciting times. While it took eons to move from the invention of the wheel to the advent of the internal combustion engine, it required mere decades to advance from the vacuum-tube-packed ENIAC and

Univacs of the 1940s and '50s to the smart global networks that are now emerging. Sophisticated new networking and communication tools are putting the world within reach from our desktops, and the Internet is opening up new avenues for commerce, education and entertainment on a daily basis. However, we can't lose sight of the fact that networking technologies must serve business in very concrete terms. They must perform reliably day in and day out, while safeguarding proprietary data and communications. NetWare 4 provides the dependable foundation for networking, whether in a small business or a multinational corporation. It provides NDS and other unique core services. And it offers the basis for Novell's partners to use their talents to develop customer solutions that, like NetWare, just keep getting better all the time. In Novell's vision for the future, the network expands and the benefits to business expand with it. Working together with partners and customers, we are well on our way to making NetWare 4 synonymous with unlimited networking. ■

continued from page 17

Novell, connects seamlessly with all popular E-mail programs as well as Lotus Notes. In addition, GroupWise utilizes NDS technology to enable users to access E-mail, fax, voice mail, scheduling and pager messages from a Universal In Box. GroupWise also integrates seamlessly with NetWare 4 via NDS. It provides a common directory, so there is no need for

separate E-mail systems administration. And GroupWise makes all business communications available from any desktop system, mobile computer or telephone.

With this kind of wide-open, universal access for users and single-point access for network managers, NetWare 4 provides the foundation for an even more productive networking future. It's a future that lets administrators and users concentrate

much more on the job at hand instead of the technology that helps get the job done. And that's a formula for a bright future indeed. ■

Learn more about NetWare 4 by calling
1-800-844-6661 or 1-512-434-1524,
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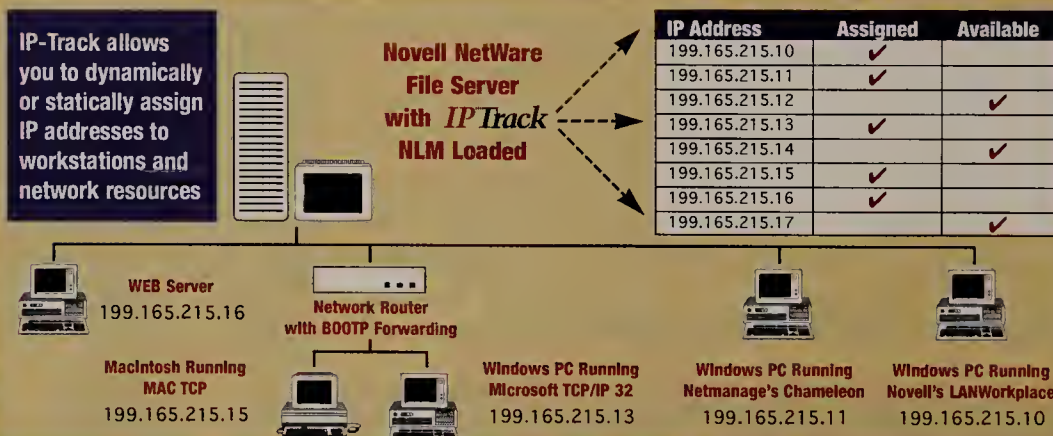
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IP-Track uses DHCP (Dynamic Host Configuration Protocol) and BOOTP (Bootstrap IP Protocol), and is the only NLM solution for centrally managing IP addresses on PCs and MACs on your Novell network and supports Class A, B and C networks.



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Vendors belt out middleware medley

By Barb Cole

Several companies this week will announce data access tools designed to better handle mixed database environments, support remote users and simplify middle-tier administration.

Two players in the Open Database Connectivity (ODBC) middleware space — Visigenic Software, Inc. and Intersolv, Inc. — will roll out offerings that eliminate the requirement to install multiple ODBC drivers on client computers to access different databases.

This new breed of ODBC middleware requires only one ODBC driver on the client that connects to a driver manager on the server to access multiple databases. As well as being easier to manage, this architecture is expected to be more scalable as data access is handled by servers. Visigenic's product is called OpenChannel and includes OpenChannel Client for Java for accessing corporate data via the Internet. OpenChannel also has a Java Database Connectivity (JDBC)-to-ODBC interface, which will permit applications written to SunSoft, Inc.'s JDBC to work with existing ODBC servers.

OpenChannel Server includes an ODBC Driver Manager and a collection of database-specific drivers; it runs on Windows NT servers.

Separately, Intersolv will announce Sequelink 3.01, a version of the Sequelink server-based middleware it acquired through the buyout of Phynosis International, Inc. The new edition includes

Intersolv's SmartData technology for culling data via Sequelink and delivering the data via any ODBC-compliant query or reporting tool.

Analysts said the vendors are responding to customer demand for more robust data access products. "The area of data access middleware is hot, and the vendors are all scurrying to improve the scalability of their products," said Ed Acly, an analyst at International Data Corp. in Framingham, Mass.

MIDDLEWARE MEDIA

Vendor	Product	Pricing	Availability
Intersolv	Sequelink 3.01	\$99 per user for existing Sequelink users; \$2,795 for new customers	Now
HP	ORB Plus 2.0	Developer seats: \$2,000 to \$3,000; run-times: \$50-\$200	Now
	Distributed Enterprise/Service Monitor	\$6,000-\$8,000	June
	Encina/9000 2.2	\$5,500	Now
Information Builders	EDA 4	Components priced from \$5,000-\$55,000	By year-end
Visigenic	OpenChannel	\$3,925 for five users	Q2

Server-based middleware veterans, such as Information Builders, Inc. (IBI) and Hewlett-Packard Co., are also looking to improve the reach of their offerings, Acly said.

IBI last week announced Enterprise Data Access (EDA) Version 4, which now has messaging and queuing service, as well as Web support.

EDA/Message Hub and EDA/Message Switch are new options for moving EDA messages across Microsoft Exchange

Server and IBM MQ Series.

Another add-on, EDA/WebLink, lets users connect their applications through middleware to the World-Wide Web and corporate intranets.

Separately, HP next week will announce a series of products focused on improving the manageability of its middleware.

The company will roll out Version 2.0 of its ORB Plus object request broker, which now supports the Object Management Group's CORBA 2.0 specifica-

tion and runs on Windows NT and Solaris.

HP will also announce Distributed Enterprise/Service Monitor, an HP-UX or OpenView add-on that monitors the status of Distributed Computing Environment services.

Also from HP is Encina/9000 2.2, a new edition of the transaction processing software.

©Visigenic: (415) 286-1900; Intersolv: (301) 838-5000; IBI: (212) 736-4433; HP: (800) 637-7740, Ext. 1587.

Messaging

Isocor's N-PLEX server supports 'Net and messaging standards

By Carol Sliwa

Santa Monica, Calif.

Isocor last week released server software that will let companies connect to the Internet and implement managed intranet applications.

Key features of Isocor's new N-Plex software package include a centralized management program, a Web server, and standards-based Internet and X.400 messaging capabilities.

"For a small- to medium-sized company, this lets it tie into the outside X.400 and Internet world at a relatively cheap

cost. They won't have to pay for a direct line to an Internet provider," said Dean Thompson, lead systems engineer for Berish & Associates, a Cleveland-based consultancy that has beta-tested N-Plex.

N-Plex includes an Internet mail server that supports Simple Mail Transfer Protocol/Multipurpose Internet Mail Extensions. It also has a message store that conforms to POP3 and Internet Message Access Protocol Version 4.

"The market is maturing for standards-based backbones," said William Wolfe, Isocor's vice president of marketing and business development. He acknowledged that N-Plex is geared toward working with Internet mail clients such as the Eudora

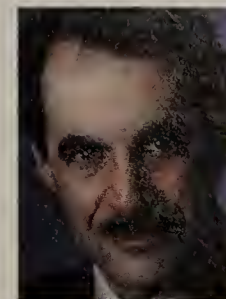
product line from Qualcomm, Inc. and Zmail from Network Computing Devices, Inc.

But plans call for the development of gateway products that will allow the N-Plex server software to work with proprietary electronic mail systems such as Microsoft Corp.'s Microsoft Mail and Lotus Development Corp.'s cc:Mail, a company official said.

Since N-Plex is modular in design, additional servers, gateways, clients and software components

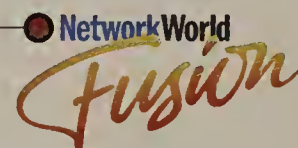
can be added. Pricing ranges from \$3,250 to \$50,000, depending on the number of users and processors. The initial N-Plex version runs on a Windows NT server and requires a Pentium processor, 32M bytes of RAM, a CD-ROM drive and a 1G-byte hard drive.

©Isocor: (310) 581-8100.



Isocor's William Wolfe says the market is maturing for standards-based backbones.

See what intranet bundles other vendors are offering on Network World Fusion (<http://www.nwfusion.com>). Select News+ then Client/Server Applications.



Web tools

Continued from page 47

re's Bind Editor reads the database structure, analyzes it and lets the developer patch up text fields in the graphical user interface application with the relevant database tables. The tool set generates the common Gateway Interface (GI) in C or C++ to provide fast database access. Sapphire developers can use existing SQL and database stored procedures, but offering also includes tools for creating SQL code for new applications.

Version I.I offers much easier installation and setup. Version 2.0 will include support for Windows and Windows NT computers, as well as OLE interfaces, and it will connect with remote databases via the Open Data-

base Connectivity (ODBC) interface.

■ Forte Software, Inc. by June will ship the Forte Web Software Development Kit (SDK), which lets Web browsers access server-based applications built with Forte's object-oriented fourth-generation language tool set.

The SDK includes a high-performance CGI link — called a shared service — between the Web server and the Forte application.

Also part of the kit are class libraries for building HTML pages and a special converter program that automatically transforms a Forte client GUI into an HTML equivalent.

Later this year, Forte will add software to let Java applications access Forte shared services.

■ Sterling Software, Inc.'s Desktop Integration Division an-

nounced plans for two new products to link Web applications with legacy applications and data.

The first, StarView, is a program that runs on a Windows NT server and automatically converts 3270 datastreams to HTML pages, which can be read by any HTML browser.

The product will let Web clients access MVS applications across SNA nets without changing the host applications but maintaining all existing security.

The second product, StarGate, will add graphical development tools, additional emulators, an ODBC interface and support for several languages, such as Java and Microsoft Visual Basic Scripting Edition.

■ Texas Instruments Software, part of Texas Instruments, Inc., will release WebCenter, which is

software that links Web servers with server-based applications created with TI's Composer. Composer blends application modeling facilities with code generation.

WebCenter runs on the Web server. A browser request to the server is passed to WebCenter, which connects with Composer applications or, via middleware, to transaction monitors and legacy data.

WebCenter itself has a Web interface, so it can be managed by users equipped with a Web browser.

■ Compuware Corp.'s Uniface group will release the Uniface Web Enabler, which links Web servers with distributed applications built with the Uniface tool set. The software will support links to networked databases via a CGI connection and Uniface's

own specially designed database drivers. Web Enabler will connect with the various Uniface Application Services and databases to satisfy a request originating from a Web browser.

Later, Uniface plans to add controls that will let developers create graphical Uniface forms that can combine structured information, such as fields and records from a database, with unstructured HTML information.

Another change will let Uniface client applications be modified or updated via a Web link.

©Bluestone: (609) 727-4600; Forte Software: (510) 869-3400; Sterling Software Desktop Integration Division: (415) 802-7100; Texas Instruments Software: (800) 336-5236; Uniface: (510) 748-6000.

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SHARED LOGIC

Getting around groupware incompatibility

It will only cost you about \$50 per desktop this year to get an integrated messaging and groupware client that supports E-mail, group scheduling, task management, discussion databases and simple workflows. Lotus Development Corp., Microsoft Corp. and Novell, Inc. are offering or will soon offer such clients.

But dare we look this gift horse in the mouth?

You bet. Even though integrated groupware packages deliver great functionality, they tend to have uneven cross-platform capabilities, feature limited scalability and remain heavily proprietary. You won't have much luck getting Notes

to talk to Exchange or Exchange to talk to Group-Wise when it comes to calendaring, forms, discussion databases and workflow.

Dan Blum

Are users doomed to be separated by islands of groupware? Not necessarily. There's an alternative groupware architecture called best of breed. This approach might entail, for example, selecting one vendor for messaging, another for calendaring and still others for the remaining groupware functions. It relies on the products being compatible in certain respects, however, and may necessitate a more complicated product selection process.

"The integrated groupware solutions don't satisfy the requirements of our unique environment," said Steve Wincor, a senior technical architect at Lockheed Martin Missiles & Space. He has evaluated many groupware offerings, including 66 different scheduling products.

"If we make standards the driving factor in our product selection, we'll be safe," he said.

Wincor's plan is to use a calendaring product that can work over TCP/IP, send notifications via the Simple Mail Transfer Protocol, plug into a World-Wide Web browser, and import its user list from X.500 or other directories.

To position your organization for the groupware challenge, consider the following tips:

■ **Build a reliable messaging network.** Many of the next-generation groupware and workflow capabilities will work best over a solid underlying messaging infrastructure. Put the horse before the cart.

■ **Develop a messaging and groupware strategy.** An integrated groupware approach can work nicely if you roll the package out decisively across the entire enterprise, without too much cross-platform irregularity. Otherwise, the best-of-breed approach may be your best bet.

■ **Use a solid and flexible network operating system.** As you start to push some of

the security, replication and directory functions into the NOS, administration will be easier.

■ **Use products based on standards-based APIs and protocols.** If you're already stuck with more than one groupware

package, arm your users with Web browsers. Almost without exception, major vendors are moving to enable universal Web client access to mailboxes, databases and workflow engines.

"The Web is a catalyst, speeding up

both usage and interoperability," said Jim Cunnie, a director of business development at AT&T. "But it may also speed up certain kinds of problems."

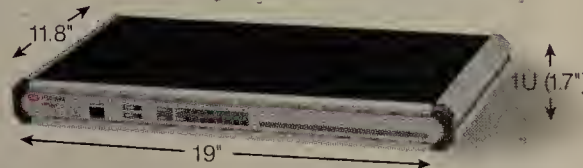
But at least some of these problems are good to have.

Blum is a principal at Rapport Communication, a consultancy that focuses on messaging, groupware and electronic commerce. He can be reached at dblum@interramp.com.

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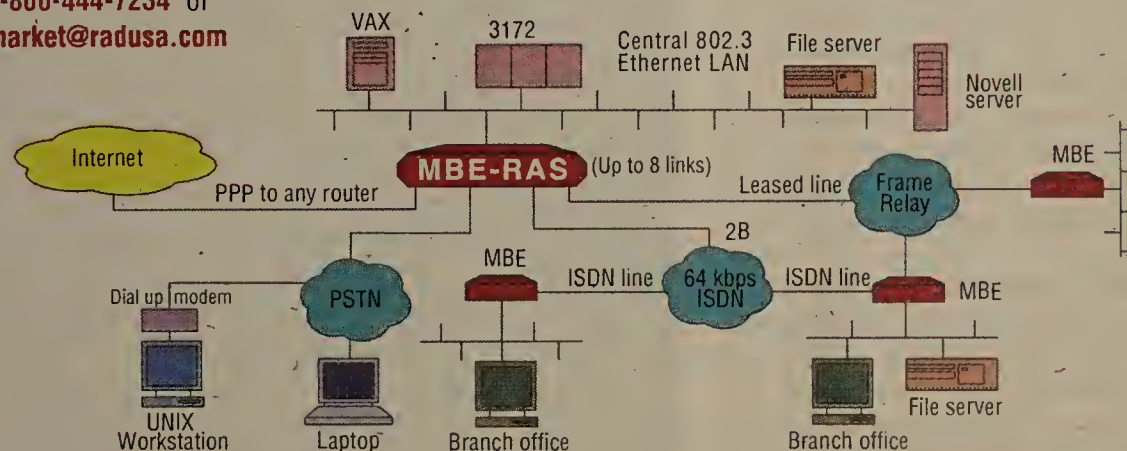


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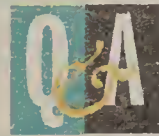
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IBM software executive talks up client/server computing



Steven Mills, general manager of IBM's Software Solutions division, recently spoke at a large industry trade show in Hannover, Germany, about IBM's new vision for client/server, a concept the company calls network-centric computing. Before taking the stage, Mills talked about that subject with IDG News Service correspondent Jon Skillings.

What's new in IBM's current vision for client/server computing?

[There are new] application scenarios emerging in the so-called network-centric kinds of environments, whether they be characterized by Internet servers or intranet servers. These things vary depending on whether a business wants to open up for public access or simply serve other businesses on a business-to-business basis.



IBM's Mills says the firm is moving to a more open-ended, collaborative environment.

Within that context, we see a range of applications [including] pure content hosting that are focused on broad-based general access to content for whatever benefit one can derive from that sort of classic Web server access scenario. [Others will focus on] transactions — they're looking to make money by offering this as a service.

How will the new client/server environment handle the volume of transactions?

A server can explode if you literally try to serve tens of millions of users. We have already solved those problems of robust serving. There are many institutions — maybe banks or Federal Express — running big services from things like System/390 and SP2 platforms that are handling substantial volumes.

Transaction volume isn't so much the issue. You run into issues of recovery, and you run into issues of security. These are the bigger concerns that companies are facing.

The people who are doing business with you want to have a certain guaranteed level of service; server availability becomes an issue, so the configuration planning becomes important. Do the servers log and recover transactions? What happens if the server goes down? Do they lose some operation?

How much do you have to relearn to make mainframe sorts of techniques work in this new environment?

You apply a lot of the same techniques that you've already applied with the 390 to those platforms. You'll see transaction monitoring functions emerging in popularity, whether it's using products like our

MQSeries, CICS or Encina. All those products I've mentioned are running on PC-based servers and are in fact World-Wide Web-enabled. So you can build one

of these applications on top of an existing robust server infrastructure.

Is this essentially Mainframe Computing Part 2, with PCs hooked up together into central systems?

What we're moving to is a much more open-ended, collaborative type of environment in which your connection is to many servers. And increasingly, that connection will be transparent to you, so

you're basically logging on to a function, not an application.

Today, in wandering the Internet, you have to have a URL, an address, you have to know where you're going.

In the future, you'll see more things emerge that provide you with directory services, automatic connection, and you'll be able to express through your Web browser what you're interested in. The browser will connect you to inter-



gent directory and agent functions to look for the things that match your interest. It's an environment which is highly networked, highly interactive and fully connected.

So it's a significant step up from the kind of linked client/server computing that people are used to. Client/server provided a step forward, but increasingly, people are beginning to see that as limited.

What kinds of client/server applications can we expect from IBM?

Our prime thrust at the software end is to be an application-hosting provider. Our predominant business is in delivering server systems and the associated software, and delivering robustness, reliability and recoverability for businesses.

So we're providing Web-serving support for businesses that want to do generic Web-serving applications, growing up to

more complex transaction kinds of applications. Along the way, we're supporting a variety of emerging standards — whether it be Java or VRML — support for interfaces promoted by Netscape and Microsoft, for anything that touches the client side of the application.

What's your take on the importance of Java?

People aren't necessarily going to

build their applications in Java. Java offers interesting facilities for downloadable active content. So within a Web server, you might create a hot spot, a hyperlink to a Java routine that when triggered, downloads to somebody's Web browser something that's enabled to play that particular piece of code. Java is dynamic in nature — you're not going to build a multihundred-transaction-per-second system writing in Java; you're going to write it in C. ■

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Lotus updates Notes-to-Web software tool

By Carol Sliwa

Cambridge, Mass.

Now that Notes Release 4.0 is available, Lotus Development Corp. is starting to roll out the companion products for its client/server groupware software.

At last week's Internet & Electronic Commerce Conference, the company launched InterNotes Web Publisher 4.0, the latest version of its software for creating and managing internal and public World-Wide Web sites.

With the InterNotes Web publisher, Notes documents are automatically translated into HTML pages for publication on the Web.

The new 4.0 version, which updates InterNotes Web Publisher 2.0, also translates graphical images from Notes 4.0 documents directly into HTML image maps on the Web.

For Dan Grant, manager of Web development at Mobility Canada, Inc. in Toronto, the simplification of design elements in Release 4.0 makes it easier to train the people who manage the content of his company's Web page. "That's really where our cost saving is on a lot of this stuff," he said.

Grant said the old version was not as intuitive as the new one.

"For example, [inserting] the bullets or creating tables easily on the fly within [the last version] was kind of hard because you had to manually enter HTML code right into it," he said. "That kind of defeats the purpose of the Web publisher itself."

Other new features in Release 4.0 include client- and server-based image-map creation, drag-and-drop capabilities for constructing Web views and the ability to run multiple simultaneous searches. The software also runs on more platforms, adding AIX, Solaris and Windows 95 to OS/2 and Windows NT.

InterNotes Web Publisher 4.0 can be downloaded free from Lotus' Web site at <http://www.internotes.lotus.com>. The software also will be included with Notes Release 4.1 server software due out in April.

To use Web Publisher, Notes Release 4.X server software and an HyperText Transfer Protocol server with TCP/IP are needed.

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Vendors test data conferencing standard

By Barb Cole

Santa Clara, Calif.

A key data conferencing standard got a boost last week when more than 20 vendors reported a high rate of success at an interoperability test gathering.

About 98% of the interoperability tests conducted on products compliant with

the International Telecommunication Union (ITU) T.120 Audio Visual Conferencing Service standard were successful, according to Neil Starkey, president of the International Multimedia Teleconferencing Consortium, Inc. The group consists of 90 software companies, computer manufacturers and telecommunications firms

that support T.120.

The interoperability tests took place at a three-day event, dubbed Event-120, sponsored by T.120 backers Microsoft Corp. and Intel Corp.

T.120 is a collection of protocols and services for data conferencing among many participants via standard phone

lines, ISDN and LANs.

T.120 is key since many competing companies offer the ability to collaborate in real time and use computers to view documents, make annotations and run applications concurrently. But most vendors have proprietary implementations, so users on both sides must have the same software to collaborate.

The standard is also expected to offer a way to mix different communications links in a multiparty conference. In addition, it will work with other ITU standards that cover multimedia conferencing.

More than 140 tests were done at the event over analog and digital phone lines, LANs and the Internet, for both point-to-point and multipoint connectivity. The testing targeted call setup management, call control, and file and image transfer.

Point-to-point connections over ISDN were most prone to failures, where the testing score was about 95% successful, event officials said.

Most vendors at the gathering are hard at work on T.120 products, which are expected by year-end. Some participants, such as DataBeam Corp., already offer tools that support T.120 protocols.

Analysts said the event and similar gatherings planned for the coming months will help T.120 win widespread support. "The reason the gathering was held is that everyone realizes that the T.120 work is not quite done," said Elliott Gold, president of Telespan Publishing Corp. in Altadena, Calif. ■

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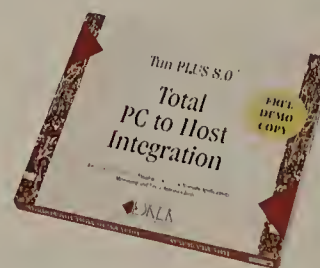
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Circle Reader Service #80

Company makes Web-to-CICS link

By Joanne Taaffe

UniKix Technologies has introduced a product aimed at helping banks, mail-order catalog houses and other companies conduct transactions over the Internet.

The company's WebKix offering is a hybrid World-Wide Web server and transaction processing monitor, according to Aidan Harney, vice president of UniKix, a subsidiary of Groupe Bull SA.

Currently in beta test in the U.S., WebKix is designed to eliminate the need for users to build graphical user interface front ends to existing CICS terminal applications, instead letting firms provide Web access to transaction applications.

End users with Web browsers from Netscape Communications Corp. and others will be able to directly access CICS applications on local and networked Unix servers.

Security features such as server authentication, data encryption, data integrity and user authorization will be provided by a third-party commerce server, according to company officials.

WebKix will be available in June or July at a cost of about \$100 per user.

For more information, contact UniKix at (800) 765-2826.

Taaffe is a Paris-based correspondent for IDG News Service.



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AIIM

Continued from page 47

tions of standards, the show will host new product rollouts.

FileNet Corp. will unwrap a collection of three product suites that combine offerings the company has picked up through acquisitions of Watermark Software, Inc., Saros Corp. and Greenbar Software, Inc.

FileNet will announce the Saros Enterprise Document Management Series, which includes Saros Mezzanine document management software; @mezzanine, for managing Web documents; image/object viewer software; and FileNet Ensemble workflow software. The Windows NT-based suite runs with Saros Document Server for BackOffice.

The company also will introduce FileNet Business Process Automation (BPA)

Series, comprising FileNet's WorkFlow Business System and computer output to laser disk (COLD) software as well as its Visual Workflo and Ensemble workflow software. The suite is designed for large deployments of workflow applications.

Another suite, dubbed Watermark BPA, is aimed at workgroups and branch offices. It will include Watermark Enterprise Series document imaging client and server software; the Enterprise Fax

Router; FileNet Ensemble; and Greenbar COLD software.

Pricing information was not available.

Separately, Toronto-based Lava Systems, Inc. will introduce its own suite, Lava 4.3. The Windows-based software includes document management, imaging and workflow software. Lava manages electronic mail, CAD, digital video and word processing files, and lets administrators build document-based workflow using graphical tools.

Lava's server software runs on Windows NT, NetWare and most versions of Unix. Pricing is \$15,000 for the server software and five client licenses. Additional clients cost \$1,200 each.

Also at the show:

■ Action Technologies, Inc. will announce Version 3.0 of its Action Workflow Enterprise Series workflow system, which adds the ability to customize the Action

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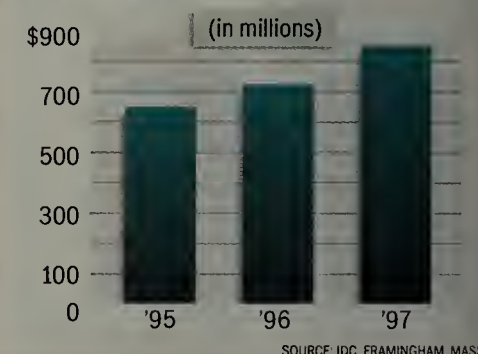
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workflow methodology. Version 3.0 also has agent performers, reusable server-based software components for automating tasks or linking to other software programs.

Available next month, Action Workflow Enterprise Series will cost \$495 for the Process Builder Analyst Edition and \$3,995 for the Developer Edition. The Process Manager component ranges from \$4,995 for 10 users to \$56,195 for unlimited users. Process Manager runs on Windows NT; Process Builder runs on Windows 95.

■ BitWise Designs, Inc. will announce its Docstar document imaging system. Docstar includes a set of Windows-based software utilities, optical character recognition software and a Microsoft Access database. It also consists of a scanning, laser printing and fax device, an optical disk storage device and a Pentium-based PC.

The Docstar system will be available by year-end, and it costs from \$12,590 to \$25,190.

■ Diamond Head Software, Inc. will announce ImageBasic 3.0, an upgrade to its document imaging and workflow add-on tool for Microsoft Visual Basic. The software, which is expected to ship in the second quarter, will appear in 32- and 16-bit ActiveX Control versions and a 16-bit VBX edition, supporting Windows 3.X, Windows 95 and Windows NT.

ImageBasic 3.0 costs \$1,750.

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1 Industry: (check one only)

- | | |
|---|--|
| 01. <input type="checkbox"/> Manufacturers (other) | 12. <input type="checkbox"/> Government (Federal/State/Local) |
| 02. <input type="checkbox"/> Finance/Banking | 13. <input type="checkbox"/> Military |
| 03. <input type="checkbox"/> Insurance/Real Estate/Legal | 14. <input type="checkbox"/> Aerospace |
| 04. <input type="checkbox"/> Health Care Services | 15. <input type="checkbox"/> Consultants (Independent) |
| 05. <input type="checkbox"/> Hospitality/Entertainment/Recreation | 16. <input type="checkbox"/> Carriers/Interconnects |
| 06. <input type="checkbox"/> Media/TV/Cable/Radio/Print | 17. <input type="checkbox"/> Manufacturers (Computer/Communications) |
| 07. <input type="checkbox"/> Retail/Wholesale Trade/Business Services | 18. <input type="checkbox"/> Resellers of Computer/Network Products (VARs, VADs, Distributors) |
| 08. <input type="checkbox"/> Transportation | 19. <input type="checkbox"/> Systems/Network Integrators |
| 09. <input type="checkbox"/> Utilities | 20. <input type="checkbox"/> Distributors (Computer/Communications) |
| 10. <input type="checkbox"/> Education | 21. <input type="checkbox"/> Other (please specify) _____ |
| 11. <input type="checkbox"/> Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry) | |

2 What is your job function? (check one only)

NETWORK IS MANAGEMENT:

- | | |
|---|--|
| 1. <input type="checkbox"/> Networking Management | 6. <input type="checkbox"/> Corporate Management (CIO, CEO, Pres., VP, Dir., Mgr., Financial Management) |
| 2. <input type="checkbox"/> LAN Management | 7. <input type="checkbox"/> Consultant (Independent) |
| 3. <input type="checkbox"/> Datacom/Telecom Management | 8. <input type="checkbox"/> Other (please specify) _____ |
| 4. <input type="checkbox"/> IS, IT, MIS, Systems Management | |
| 5. <input type="checkbox"/> Engineering Management | |

3 What is the total number of sites for which you have purchase influence? (check one only)

- | | | | |
|-------------------------------------|-------------------------------------|-----------------------------------|----------------------------------|
| 1. <input type="checkbox"/> 100+ | 3. <input type="checkbox"/> 20 - 49 | 5. <input type="checkbox"/> 2 - 9 | 7. <input type="checkbox"/> None |
| 2. <input type="checkbox"/> 50 - 99 | 4. <input type="checkbox"/> 10 - 19 | 6. <input type="checkbox"/> 1 | |

4 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

A. SCOPE (check one only)

1. ☐ Corporate/Enterprise
2. ☐ Department
3. ☐ None

B. INVOLVEMENT (check all that apply)

1. ☐ Recommend/Specify
2. ☐ Approve
3. ☐ Evaluate
4. ☐ Determine the need
5. ☐ None

5 Check ALL that apply in Columns A and B:

A. I am involved in the purchase of the following products/services:

B. I plan to purchase the following products/services:

- | | | | |
|--|--|--|----------|
| A | B | A | B |
| <input type="checkbox"/> 100 LOCAL-AREA NETWORKS | <input type="checkbox"/> 105 SOFTWARE/APPLICATIONS | <input type="checkbox"/> 106 WIDE-AREA NETWORK EQUIPMENT & SERVICES | |
| <input type="checkbox"/> 01. <input type="checkbox"/> Local-Area Networks | <input type="checkbox"/> 46. <input type="checkbox"/> Network Management | <input type="checkbox"/> 70. <input type="checkbox"/> Frame Relay Equip./Services | |
| <input type="checkbox"/> 02. <input type="checkbox"/> Network Op. Sys. Software | <input type="checkbox"/> 47. <input type="checkbox"/> Systems Management | <input type="checkbox"/> 71. <input type="checkbox"/> Modems | |
| <input type="checkbox"/> 03. <input type="checkbox"/> LAN Storage/Backup | <input type="checkbox"/> 48. <input type="checkbox"/> Security | <input type="checkbox"/> 72. <input type="checkbox"/> FT-1/T-1/T-3 Multiplexers | |
| <input type="checkbox"/> 04. <input type="checkbox"/> Optical LAN Storage/Backup | <input type="checkbox"/> 49. <input type="checkbox"/> Communications Software | <input type="checkbox"/> 73. <input type="checkbox"/> FT-1/T-1/T-3 Services | |
| <input type="checkbox"/> 05. <input type="checkbox"/> Disk LAN Storage/Backup | <input type="checkbox"/> 50. <input type="checkbox"/> Terminal Emulation | <input type="checkbox"/> 74. <input type="checkbox"/> SONET | |
| <input type="checkbox"/> 06. <input type="checkbox"/> Tape LAN Storage/Backup | <input type="checkbox"/> 51. <input type="checkbox"/> Word Processing | <input type="checkbox"/> 75. <input type="checkbox"/> Inverse Multiplexers | |
| <input type="checkbox"/> 07. <input type="checkbox"/> RAID LAN Storage/Backup | <input type="checkbox"/> 52. <input type="checkbox"/> Operating Systems | <input type="checkbox"/> 76. <input type="checkbox"/> SMDS | |
| <input type="checkbox"/> 08. <input type="checkbox"/> Network Test/Diagnostic Tools | <input type="checkbox"/> 53. <input type="checkbox"/> Client/Server Applications Development | <input type="checkbox"/> 77. <input type="checkbox"/> Asynchronous Transfer Mode | |
| <input type="checkbox"/> 09. <input type="checkbox"/> Cables, Connectors, Baluns | <input type="checkbox"/> 54. <input type="checkbox"/> Database Management/RDBMS | <input type="checkbox"/> 78. <input type="checkbox"/> Diagnostic/Test Equipment | |
| <input type="checkbox"/> 10. <input type="checkbox"/> UPS | <input type="checkbox"/> 55. <input type="checkbox"/> Spreadsheet | <input type="checkbox"/> 79. <input type="checkbox"/> DSU/CSU | |
| <input type="checkbox"/> 11. <input type="checkbox"/> Network Interface Cards | <input type="checkbox"/> 56. <input type="checkbox"/> Groupware | <input type="checkbox"/> 80. <input type="checkbox"/> VSAT/Satellite | |
| <input type="checkbox"/> 12. <input type="checkbox"/> Peer-to-Peer LANs | <input type="checkbox"/> 57. <input type="checkbox"/> EDI | <input type="checkbox"/> 81. <input type="checkbox"/> ISDN Equipment & Services | |
| <input type="checkbox"/> 13. <input type="checkbox"/> SNMP Network Management | <input type="checkbox"/> 58. <input type="checkbox"/> E-mail | <input type="checkbox"/> 82. <input type="checkbox"/> PBXs | |
| <input type="checkbox"/> 14. <input type="checkbox"/> ATM Switches | <input type="checkbox"/> 59. <input type="checkbox"/> Windows/Graphical User Interface | <input type="checkbox"/> 83. <input type="checkbox"/> Voice Mail/Response | |
| <input type="checkbox"/> 15. <input type="checkbox"/> Token-Ring Switches | <input type="checkbox"/> 60. <input type="checkbox"/> Multimedia | <input type="checkbox"/> 84. <input type="checkbox"/> Videoconferencing | |
| <input type="checkbox"/> 16. <input type="checkbox"/> Ethernet Switches | <input type="checkbox"/> 61. <input type="checkbox"/> Graphics/DTP | <input type="checkbox"/> 85. <input type="checkbox"/> Leased Lines | |
| <input type="checkbox"/> 17. <input type="checkbox"/> Remote LAN Access/Communications Servers | <input type="checkbox"/> 62. <input type="checkbox"/> Remote Access | <input type="checkbox"/> 86. <input type="checkbox"/> Switched Data | |
| <input type="checkbox"/> 18. <input type="checkbox"/> Superservers | <input type="checkbox"/> 63. <input type="checkbox"/> Imaging | <input type="checkbox"/> 87. <input type="checkbox"/> E-mail/On-line Services | |
| <input type="checkbox"/> 19. <input type="checkbox"/> File/Application Servers | <input type="checkbox"/> 64. <input type="checkbox"/> Suites | <input type="checkbox"/> 88. <input type="checkbox"/> 800/900/MTS Services | |
| <input type="checkbox"/> 20. <input type="checkbox"/> Print Servers | <input type="checkbox"/> 65. <input type="checkbox"/> Middleware | <input type="checkbox"/> 89. <input type="checkbox"/> Virtual Networks | |
| A | B | A | B |
| <input type="checkbox"/> 101 INTERNETWORKING | <input type="checkbox"/> 106 WIDE-AREA NETWORK EQUIPMENT & SERVICES | <input type="checkbox"/> 90. <input type="checkbox"/> Outsourcing/Systems Integration Services | |
| <input type="checkbox"/> 21. <input type="checkbox"/> Bridges | <input type="checkbox"/> 70. <input type="checkbox"/> Frame Relay Equip./Services | <input type="checkbox"/> 91. <input type="checkbox"/> Education/Training Services | |
| <input type="checkbox"/> 22. <input type="checkbox"/> Routers | <input type="checkbox"/> 71. <input type="checkbox"/> Modems | <input type="checkbox"/> 92. <input type="checkbox"/> None of the above (1-91) | |
| <input type="checkbox"/> 23. <input type="checkbox"/> Bridge/Router | <input type="checkbox"/> 72. <input type="checkbox"/> FT-1/T-1/T-3 Multiplexers | | |
| <input type="checkbox"/> 24. <input type="checkbox"/> Gateways | <input type="checkbox"/> 73. <input type="checkbox"/> FT-1/T-1/T-3 Services | | |
| <input type="checkbox"/> 25. <input type="checkbox"/> Intelligent Hubs/Stackables | <input type="checkbox"/> 74. <input type="checkbox"/> SONET | | |
| A | B | A | B |
| <input type="checkbox"/> 102 COMPUTERS/PERIPHERALS | <input type="checkbox"/> 106 WIDE-AREA NETWORK EQUIPMENT & SERVICES | <input type="checkbox"/> 90. <input type="checkbox"/> Outsourcing/Systems Integration Services | |
| <input type="checkbox"/> 26. <input type="checkbox"/> Laptops/Notebooks/Sub-Notebooks | <input type="checkbox"/> 70. <input type="checkbox"/> Frame Relay Equip./Services | <input type="checkbox"/> 91. <input type="checkbox"/> Education/Training Services | |
| <input type="checkbox"/> 27. <input type="checkbox"/> Micros/PCs | <input type="checkbox"/> 71. <input type="checkbox"/> Modems | | |
| <input type="checkbox"/> 28. <input type="checkbox"/> Minis | <input type="checkbox"/> 72. <input type="checkbox"/> FT-1/T-1/T-3 Multiplexers | | |
| <input type="checkbox"/> 29. <input type="checkbox"/> Mainframes | <input type="checkbox"/> 73. <input type="checkbox"/> FT-1/T-1/T-3 Services | | |
| <input type="checkbox"/> 30. <input type="checkbox"/> Workstations | <input type="checkbox"/> 74. <input type="checkbox"/> SONET | | |
| <input type="checkbox"/> 31. <input type="checkbox"/> Terminals | <input type="checkbox"/> 75. <input type="checkbox"/> Inverse Multiplexers | | |
| <input type="checkbox"/> 32. <input type="checkbox"/> Printers | <input type="checkbox"/> 76. <input type="checkbox"/> SMDS | | |
| <input type="checkbox"/> 33. <input type="checkbox"/> Cluster Controllers | <input type="checkbox"/> 77. <input type="checkbox"/> Asynchronous Transfer Mode | | |
| <input type="checkbox"/> 34. <input type="checkbox"/> Monitors | <input type="checkbox"/> 78. <input type="checkbox"/> Diagnostic/Test Equipment | | |
| <input type="checkbox"/> 35. <input type="checkbox"/> Fax/Modem Boards | <input type="checkbox"/> 79. <input type="checkbox"/> DSU/CSU | | |
| A | B | A | B |
| <input type="checkbox"/> 103 REMOTE/WIRELESS COMPUTING | <input type="checkbox"/> 106 WIDE-AREA NETWORK EQUIPMENT & SERVICES | <input type="checkbox"/> 90. <input type="checkbox"/> Outsourcing/Systems Integration Services | |
| <input type="checkbox"/> 36. <input type="checkbox"/> PDAs | <input type="checkbox"/> 70. <input type="checkbox"/> Frame Relay Equip./Services | <input type="checkbox"/> 91. <input type="checkbox"/> Education/Training Services | |
| <input type="checkbox"/> 37. <input type="checkbox"/> PCMCIA Devices | <input type="checkbox"/> 71. <input type="checkbox"/> Modems | | |
| <input type="checkbox"/> 38. <input type="checkbox"/> Wireless Data Services | <input type="checkbox"/> 72. <input type="checkbox"/> FT-1/T-1/T-3 Multiplexers | | |
| <input type="checkbox"/> 39. <input type="checkbox"/> Wireless Data Equipment | <input type="checkbox"/> 73. <input type="checkbox"/> FT-1/T-1/T-3 Services | | |
| <input type="checkbox"/> 40. <input type="checkbox"/> Wireless LANs | <input type="checkbox"/> 74. <input type="checkbox"/> SONET | | |
| <input type="checkbox"/> 41. <input type="checkbox"/> Cellular Equipment & Services | <input type="checkbox"/> 75. <input type="checkbox"/> Inverse Multiplexers | | |
| A | B | A | B |
| <input type="checkbox"/> 104 INTERNET/ELECTRONIC COMMERCE | <input type="checkbox"/> 106 WIDE-AREA NETWORK EQUIPMENT & SERVICES | <input type="checkbox"/> 90. <input type="checkbox"/> Outsourcing/Systems Integration Services | |
| <input type="checkbox"/> 42. <input type="checkbox"/> Internet Access Providers | <input type="checkbox"/> 70. <input type="checkbox"/> Frame Relay Equip./Services | <input type="checkbox"/> 91. <input type="checkbox"/> Education/Training Services | |
| <input type="checkbox"/> 43. <input type="checkbox"/> Firewalls | <input type="checkbox"/> 71. <input type="checkbox"/> Modems | | |
| <input type="checkbox"/> 44. <input type="checkbox"/> Web Servers/Browsers | <input type="checkbox"/> 72. <input type="checkbox"/> FT-1/T-1/T-3 Multiplexers | | |
| <input type="checkbox"/> 45. <input type="checkbox"/> Internet Software Tools | <input type="checkbox"/> 73. <input type="checkbox"/> FT-1/T-1/T-3 Services | | |

B1 0496

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

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9501

6 What is the total number of LANs, workstations/nodes at this location/ in your organization?

At this location:

- | LANs | Workstations/
Nodes |
|---|--------------------------|
| 1. <input type="checkbox"/> 5,000+ | <input type="checkbox"/> |
| 2. <input type="checkbox"/> 1,000 - 4,999 | <input type="checkbox"/> |
| 3. <input type="checkbox"/> 100 - 999 | <input type="checkbox"/> |
| 4. <input type="checkbox"/> 50 - 99 | <input type="checkbox"/> |
| 5. <input type="checkbox"/> 10 - 49 | <input type="checkbox"/> |
| 6. <input type="checkbox"/> 1 - 9 | <input type="checkbox"/> |

Entire organization:

- | LANs | Workstations/
Nodes |
|---|--------------------------|
| 1. <input type="checkbox"/> 5,000+ | <input type="checkbox"/> |
| 2. <input type="checkbox"/> 1,000 - 4,999 | <input type="checkbox"/> |
| 3. <input type="checkbox"/> 100 - 999 | <input type="checkbox"/> |
| 4. <input type="checkbox"/> 50 - 99 | <input type="checkbox"/> |
| 5. <input type="checkbox"/> 10 - 49 | <input type="checkbox"/> |
| 6. <input type="checkbox"/> 1 - 9 | <input type="checkbox"/> |

7 Check ALL that apply in Columns A and B:

A. The following network platforms are currently installed:

B. The following network platforms are planned for purchase:

- | | | | |
|--|--|--|--------------------------|
| A | B | A | B |
| <input type="checkbox"/> 55 NETWORK ARCHITECTURES | <input type="checkbox"/> 57 LAN ENVIRONMENT | <input type="checkbox"/> 57 LAN ENVIRONMENT | <input type="checkbox"/> |
| <input type="checkbox"/> 01. <input type="checkbox"/> SNA | <input type="checkbox"/> 22. <input type="checkbox"/> 4M Token Ring | <input type="checkbox"/> 22. <input type="checkbox"/> 4M Token Ring | <input type="checkbox"/> |
| <input type="checkbox"/> 02. <input type="checkbox"/> DECnet | <input type="checkbox"/> 23. <input type="checkbox"/> 16M Token Ring | <input type="checkbox"/> 23. <input type="checkbox"/> 16M Token Ring | <input type="checkbox"/> |
| <input type="checkbox"/> 03. <input type="checkbox"/> TCP/IP | <input type="checkbox"/> 24. <input type="checkbox"/> Ethernet | <input type="checkbox"/> 24. <input type="checkbox"/> Ethernet | <input type="checkbox"/> |
| <input type="checkbox"/> 04. <input type="checkbox"/> Novell IPX/SPX | <input type="checkbox"/> 25. <input type="checkbox"/> 100M Ethernet | <input type="checkbox"/> 25. <input type="checkbox"/> 100M Ethernet | <input type="checkbox"/> |
| <input type="checkbox"/> 05. <input type="checkbox"/> APPC/APPN/LU 6.2 | <input type="checkbox"/> 26. <input type="checkbox"/> StarLAN | <input type="checkbox"/> 26. <input type="checkbox"/> StarLAN | <input type="checkbox"/> |
| <input type="checkbox"/> 06. <input type="checkbox"/> NETBIOS | <input type="checkbox"/> 27. <input type="checkbox"/> FDDI | <input type="checkbox"/> 27. <input type="checkbox"/> FDDI | <input type="checkbox"/> |
| <input type="checkbox"/> 07. <input type="checkbox"/> AppleTalk | <input type="checkbox"/> 28. <input type="checkbox"/> LocalTalk | <input type="checkbox"/> 28. <input type="checkbox"/> LocalTalk | <input type="checkbox"/> |
| <input type="checkbox"/> 08. <input type="checkbox"/> NFS | <input type="checkbox"/> 29. <input type="checkbox"/> 10Base-T | <input type="checkbox"/> 29. <input type="checkbox"/> 10Base-T | <input type="checkbox"/> |
| <input type="checkbox"/> 09. <input type="checkbox"/> Other (please specify) _____ | <input type="checkbox"/> 30. <input type="checkbox"/> ATM | <input type="checkbox"/> 30. <input type="checkbox"/> ATM | <input type="checkbox"/> |
| A | B | A | B |
| <input type="checkbox"/> 56 NETWORK OPERATING SYSTEM | <input type="checkbox"/> 58 COMPUTER OPERATING SYSTEM | <input type="checkbox"/> 58 COMPUTER OPERATING SYSTEM | <input type="checkbox"/> |
| <input type="checkbox"/> 10. <input type="checkbox"/> Microsoft (LAN Manager) | <input type="checkbox"/> 32. <input type="checkbox"/> DOS | <input type="checkbox"/> 32. <input type="checkbox"/> DOS | <input type="checkbox"/> |
| <input type="checkbox"/> 11. <input type="checkbox"/> Novell (NetWare 2.X, 3.X) | <input type="checkbox"/> 33. <input type="checkbox"/> Unix/Xenix/AIX | <input type="checkbox"/> 33. <input type="checkbox"/> Unix/Xenix/AIX | <input type="checkbox"/> |
| <input type="checkbox"/> 12. <input type="checkbox"/> Novell (NetWare 4.X) | <input type="checkbox"/> 34. <input type="checkbox"/> OS/2 | <input type="checkbox"/> 34. <input type="checkbox"/> OS/2 | <input type="checkbox"/> |
| <input type="checkbox"/> 13. <input type="checkbox"/> Windows NT | <input type="checkbox"/> 35. <input type="checkbox"/> OS/2 Warp | <input type="checkbox"/> 35. <input type="checkbox"/> OS/2 Warp | <input type="checkbox"/> |
| <input type="checkbox"/> 14. <input type="checkbox"/> Windows NT/Advanced Server | <input type="checkbox"/> 36. <input type="checkbox"/> IBM MVS | <input type="checkbox"/> 36. <input type="checkbox"/> IBM MVS | <input type="checkbox"/> |
| <input type="checkbox"/> 15. <input type="checkbox"/> LocalTalk (AppleTalk) | <input type="checkbox"/> 37. <input type="checkbox"/> IBM VM | <input type="checkbox"/> 37. <input type="checkbox"/> IBM VM | <input type="checkbox"/> |
| <input type="checkbox"/> 16. <input type="checkbox"/> Banyan (VINES) | <input type="checkbox"/> 38. <input type="checkbox"/> Digital VMS | <input type="checkbox"/> 38. <input type="checkbox"/> Digital VMS | <input type="checkbox"/> |
| <input type="checkbox"/> 17. <input type="checkbox"/> IBM (LAN Server) | <input type="checkbox"/> 39. <input type="checkbox"/> Macintosh | <input type="checkbox"/> 39. <input type="checkbox"/> Macintosh | <input type="checkbox"/> |
| <input type="checkbox"/> 18. <input type="checkbox"/> IBM (PC LAN Program) | <input type="checkbox"/> 40. <input type="checkbox"/> Windows | <input type="checkbox"/> 40. <input type="checkbox"/> Windows | <input type="checkbox"/> |
| <input type="checkbox"/> 19. <input type="checkbox"/> Artisoft (LANtastic) | <input type="checkbox"/> 41. <input type="checkbox"/> Windows 95 | <input type="checkbox"/> 41. <input type="checkbox"/> Windows 95 | <input type="checkbox"/> |
| <input type="checkbox"/> 20. <input type="checkbox"/> Digital (Pathworks) | <input type="checkbox"/> 42. <input type="checkbox"/> X Window System | <input type="checkbox"/> 42. <input type="checkbox"/> X Window System | <input type="checkbox"/> |
| <input type="checkbox"/> 21. <input type="checkbox"/> Other (please specify) _____ | <input type="checkbox"/> 43. <input type="checkbox"/> Solaris | <input type="checkbox"/> 43. <input type="checkbox"/> Solaris | <input type="checkbox"/> |
| | <input type="checkbox"/> 44. <input type="checkbox"/> Other (please specify) _____ | <input type="checkbox"/> 44. <input type="checkbox"/> Other (please specify) _____ | <input type="checkbox"/> |
| | <input type="checkbox"/> 45. <input type="checkbox"/> None of the above (1-44) | <input type="checkbox"/> 45. <input type="checkbox"/> None of the above (1-44) | <input type="checkbox"/> |

8 For which areas outside of North America do you have purchase influence? (check all that apply)

- | | | |
|------------------------------------|---|---|
| 1. <input type="checkbox"/> Europe | 3. <input type="checkbox"/> South America | 5. <input type="checkbox"/> Middle East |
| 2. <input type="checkbox"/> Asia | 4. <input type="checkbox"/> Australia | 6. <input type="checkbox"/> None |

9 Do you have or plan to install client/server networks? ☐ Yes ☐ No

10 Which of the following hardware platforms are installed/planned in your company? (check all that apply)

- | Mainframes | | Minis | |
|-------------------------------------|--------------------------|--|--------------------------|
| A - Installed | B - Planned | C - Installed | D - Planned |
| 1. <input type="checkbox"/> IBM | <input type="checkbox"/> | 1. <input type="checkbox"/> IBM | <input type="checkbox"/> |
| 2. <input type="checkbox"/> Amdahl | <input type="checkbox"/> | 2. <input type="checkbox"/> Digital | <input type="checkbox"/> |
| 3. <input type="checkbox"/> Cray | <input type="checkbox"/> | 3. <input type="checkbox"/> Tandem | <input type="checkbox"/> |
| 4. <input type="checkbox"/> Hitachi | <input type="checkbox"/> | 4. <input type="checkbox"/> Unisys | <input type="checkbox"/> |
| 5. <input type="checkbox"/> Unisys | <input type="checkbox"/> | 5. <input type="checkbox"/> AT&T GIS | <input type="checkbox"/> |
| | | 6. <input type="checkbox"/> HP | <input type="checkbox"/> |
| | | 7. <input type="checkbox"/> Data General | <input type="checkbox"/> |

Which of the following do you have installed/planned: (USE NUMBERS ONLY)

	At this location:		Entire organization:	
	E - Servers	F - Clients/Nodes	G - Servers	H - Clients/Nodes
1. Power PC				
2. Power Macintosh				
3. Macintosh (Other)				
4. Pentium-based				
5. 80486-based				
6. 80386-based				
7. 80286-based				
8. RISC-based workstations				
9. Other				

11 What is the estimated value of networking equipment and services that you help specify, recommend or approve annually? (check one only)

- | | | |
|--|--|--|
| 01. <input type="checkbox"/> \$100 million or more | 05. <input type="checkbox"/> \$10 million - \$19.9 million | 09. <input type="checkbox"/> \$250,000 - \$499,999 |
| 02. <input type="checkbox"/> \$50 million - \$99.9 million | 06. <input type="checkbox"/> \$5 million - \$9.9 million | 10. <input type="checkbox"/> \$249,999 or less |
| 03. <input type="checkbox"/> \$25 million - \$49.9 million | 07. <input type="checkbox"/> \$1 million - \$4.9 million | 11. <input type="checkbox"/> None of the above |
| 04. <input type="checkbox"/> \$20 million - \$24.9 million | 08. <input type="checkbox"/> \$500,000 - \$999,999 | |

12 Estimated gross annual revenue of your entire company/institution: (check one only)

- | | | |
|--|--|--|
| 1. <input type="checkbox"/> \$10 billion or more | 4. <input type="checkbox"/> \$100 million to \$499.9 million | 7. <input type="checkbox"/> \$5 million to \$9.9 million |
| 2. <input type="checkbox"/> \$1 billion to \$9.9 billion | 5. <input type="checkbox"/> \$50 million to \$99.9 million | 8. <input type="checkbox"/> \$4.9 million or less |
| 3. <input type="checkbox"/> \$500 million to \$999.9 million | 6. <input type="checkbox"/> \$10 million to \$49.9 million | 9. <input type="checkbox"/> None of the above |

13 Estimated number of employees at this location/in entire organization:

- | At this location: | Entire organization: |
|---|---|
| 1. <input type="checkbox"/> Over 10,000 | 1. <input type="checkbox"/> Over 10,000 |
| 2. <input type="checkbox"/> 5,000 - 9,999 | 2. <input type="checkbox"/> 5,000 - 9,999 |
| 3. <input type="checkbox"/> 2,500 - 4,999 | 3. <input type="checkbox"/> 2,500 - 4,999 |

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2. FOLD HERE & MAIL TODAY



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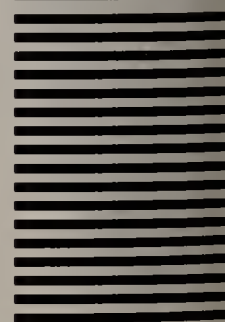
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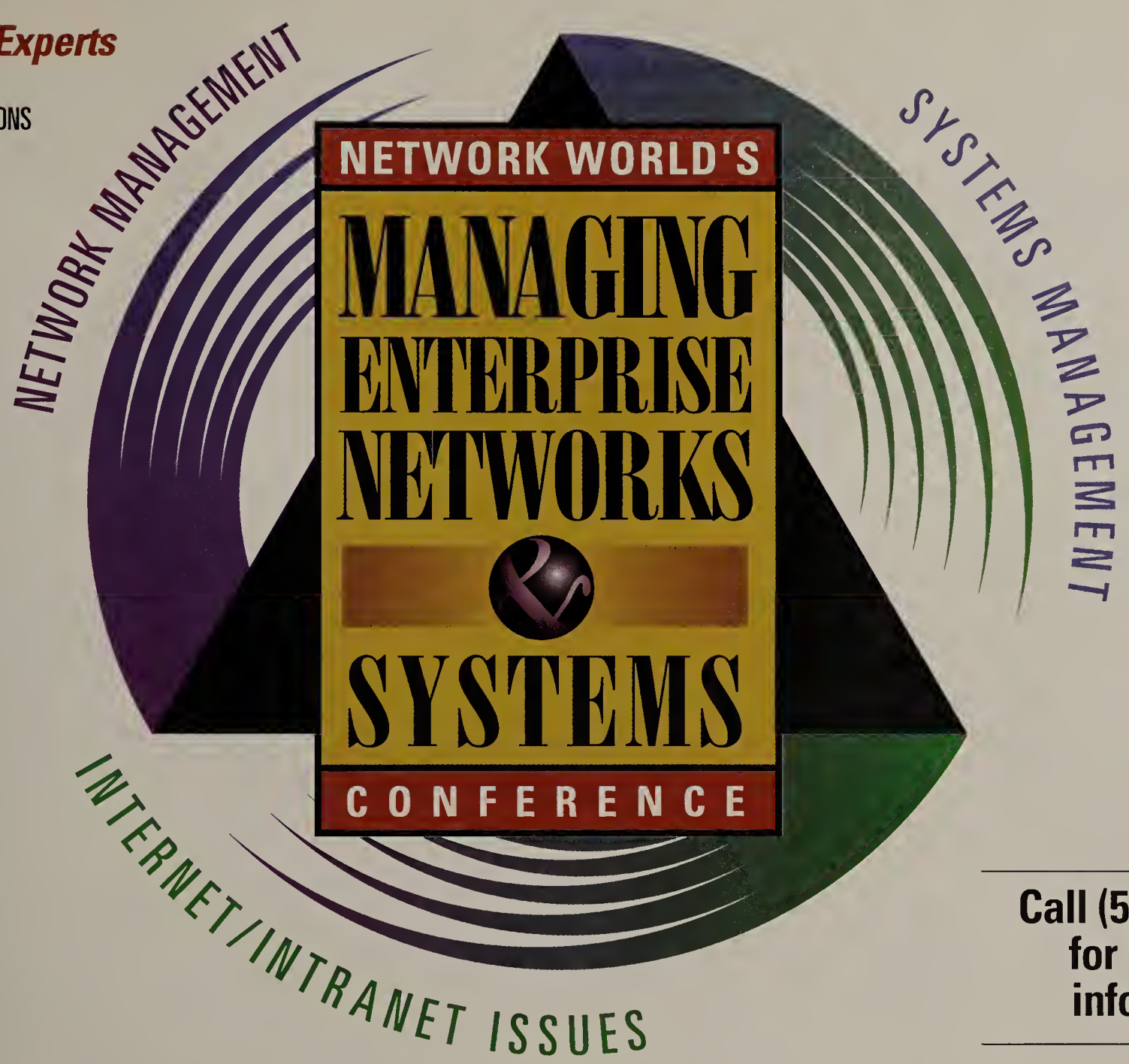
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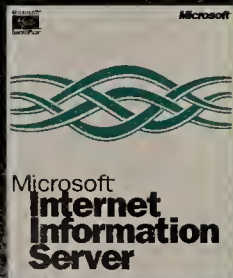
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Intranets & the 'Net

Covering: Internet Technologies and Services
for Collaboration and Electronic Commerce

Briefs

■ **Microsoft Corp.** is offering **free Internet Assistant utilities** for Excel, Access and PowerPoint which translate files into HTML. The utilities are available for free download from <http://www.microsoft.com>.

■ The choice of **free-for-download Web servers** is growing as **Interweb, Inc.** in New York posts its entry, available as source code and in a compiled version. Although the server is free, users who want its security software must pay a \$290 first-year certification fee to Verisign, Inc. for the cryptography. Interweb is available at <http://www.interwebinc.com>.

■ **Systems integrator SSDS, Inc.** this summer will begin offering a Web-based service for **managing corporate 401(k) plans** that will be accessed on internal corporate intranets or the public Internet.
SSDS: (303) 790-0660.

■ **Nomad Development Corp.** last week began shipping its **World-Wide Web/data-base application development tool**, WebDBC Version 2.5, that supports Microsoft Corp.'s ISAPI, Netscape Communications Corp.'s NSAPI and Spy's BGI interfaces. WebDBC costs \$595, and runs on Windows NT and Windows 95.
Nomad: (206) 448-1956.

■ **Bluestone** last week said it is shipping its **visual development tool** Sapphire/Web for developing internal and cross-enterprise applications for the World-Wide Web.
Bluestone: (609) 727-4600.

■ **Harbinger Corp.** this summer will ship a **\$125 World-Wide Web site builder** called TrustedLink Instant Internet, a tool aimed at small and mid-sized companies.
Harbinger: (800) 367-4272.

■ **Bell Atlantic Corp.-owned Howard W. Sams & Co.,** a publisher of over 125 business-to-business catalogs, last week said it will begin offering **on-line catalog services** and software.

Newspapers open up Web pages

By Peggy Watt

Mainstream media is getting tangled in the World-Wide Web, but it still seems afraid the 'Net will eat their investment.

"On-line publishing is a brand-new beast, and newspapers can't survive in it simply by putting the paper on-line," said Diane Burley, director of In Jersey, an on-line edition of the Asbury Park Press in New Jersey.

Major newspapers clearly consider Web-based products —

not just electronic publications — as competition for lucrative advertising markets. Last year, some 270 companies spent \$12.4 million to advertise on the Internet, according to Andrew Nibley, editor and executive vice president of Reuters NewMedia, Inc.

Many of the nation's largest newspapers have already set up Web sites and committed money and staff to on-line editions, but they are struggling to find a cohesive approach.

In fact, only two papers reported 1995 revenues of more than \$100,000 from on-line ventures, according to surveys by the research organization Kelsey Group of Princeton, N.J.

So some of the nation's leading daily newspapers are forming a cooperative organization to share customer databases and promote bulk advertisement sales across several Web sites. Under this scenario, publications would point to each other's

Web site and classified advertisements would be shared.

The co-op, called New Century Network, has the endorsement of nine major media organizations, including Gannett Company, Inc., Knight-Ridder, Inc. and The Times Mirror Co.

"This is not a gigantic coupling of dinosaurs," said Peter Winter, interim chief executive officer of New Century Network. "This is a vehicle to help all dailies capture a competitive share of the on-line market."

But newspapers need to stretch their content and offer new information or services on-line, Winter added.

But different papers find different approaches fit their needs and budget. Large dailies, such as the *San Jose Mercury News* and *The Boston Globe*, have plunged into on-line publishing with king-size budgets. The *Mercury News* began its on-line venture with Mercury Center, a subscription service on America Online. Last year it added the Mercury Center Web site at <http://www.sjmercury.com>.

The Web site provides the daily issue and like the America Online product, offers supplementary information to on-line subscribers.

Another co-op venture spawned boston.com (at <http://www.boston.com>), which links multiple New England Web sites.

A small but successful venture was launched last year by *The Leader*, a weekly in Port Townsend, Wash. Copublisher Scott Wilson considered a Web site, updated daily, a natural evolution for the paper and an extension of its community role. ■

ICA pitches another way

By Ellen Messmer

The battle to extend the reach of applications via the Web is red-hot. While Sun Microsystems, Inc. is pushing Java, Microsoft Corp. suggests companies buy into ActiveX, the Web extensions the company has written for its OLE specification.

But a far smaller company, Citrix Systems, Inc., has come up with a technology it calls Application Launching and Embedding (ALE) that enables complete 32-bit Windows applications to be published over the corporate intranet and the public Internet. Microsoft and Sun are largely focused on applets, not full-blown applications.

The three components to ALE are Intelligent Console Architecture client software, a WinFrame server, and ICA hot-links for application launching and embedding in Web pages, as well as Windows desktops and messaging systems. The ICA client will be getting wide distribution since Microsoft will support it in the next version of the firm's Internet Explorer browser and Windows NT.

Unfortunately, the Citrix WinFrame server only supports about 80 simultaneous users remotely accessing a Windows application, making it unsuitable for the large-scale use the Internet invites, acknowledged Edward Iacobucci, chairman and chief technical officer at Citrix.

©Citrix Systems: (305) 340-2246.



SmartStream Java applets extend purchasing power to corporate intranets.

D&B Software adds Java applet to SmartStream for purchasing

By Ellen Messmer

Atlanta

Next month, Dun & Bradstreet Software, Inc. will join the Java revolution when it ships a "requisitions" applet for its SmartStream workflow system.

The Java applet, used internally and sold commercially, will let users place orders electronically over the Internet and corporate intranets.

The SmartStream Procurement application, part of the larger internal D&B distributed application set, is used primarily by organizational buyers responsible for large purchasing volumes. With the Java applet, employees that buy only a few items will also be able to submit

their requests electronically to SmartStream using a Java-enabled browser.

"Our first Web-series applet will enable anyone in the corporate enterprise with a Java browser such as Netscape's to initiate a purchase requisition," said John Mansour, product director for D&B Software.

To work, the corporate Web server has to run SmartStream APIs to handle the requisition request from the D&B applet.

The Java Web user can access on-line catalogs for picking items and then place an order that is automatically tabulated. The security system requires such a password and sign-on.

©D&B Software: (404) 239-2000.

SURVEY SAYS: ON-LINE NEWSPAPERS ARE HOT

Survey base: 395 U.S. papers (190 dailies, 205 weeklies)

How many dailies have Web sites?
74 (39% of respondents)

How many dailies are planning to launch a site?
58 (31% of respondents)

How many weeklies have Web sites?
105 (51% of respondents)

How many weeklies are planning to launch sites?
42 (22% of respondents)

SOURCE: THE KELSEY GROUP

Intranets are all the rage

Interop show is launching ground for Internet and intranet products.

By Peggy Watt

Las Vegas

If this week's NetWorld+Interop 96 is any indication, World-Wide Web technology is really making its mark off-line.

New products from Simware, Inc., NetManage, Inc. and Frontier Technologies Corp. apply Web technology and techniques to internal nets and applications that do not necessarily touch the Internet.

NetManage, Inc. is putting its Web experience onto the intranet market with the release this month of NetManage IntraNet Server. This server suite features an IntraNet **NETWORLD+INTEROP** Forum Server for user collaboration, as well as a Web server, Network File System (NFS) server and Domain Name Service server.

"The Forum Server is designed for users to create and share a corporate

knowledge base, and use as a distribution and brainstorming resource," said Steve Cirimele, NetManage product manager.

Its custom Network News Transfer Protocol clients support Microsoft Corp.'s recently announced ActiveX Controls to enable on-the-fly multimedia interaction, although the initial release does not also support Sun Microsystems, Inc.'s Java. The Forum Server also supports servers and clients, newsreaders and Internet-based forums via TCP/IP, Cirimele said.

The entire suite builds on NetManage's current products and standard Internet protocols, so it can easily link to the Internet or serve strictly as an internal resource.

For example, the Windows NT-based suite can interface with Microsoft's own Internet Information Server.

The IntraNet Server suite will cost \$995, but it will be available during the second quarter at an introductory price of \$495, including a copy of NetManage's Chameleon NFS.

Simware eyes the market

Also eyeing the intranet, Simware, of Ottawa, Ontario, puts a graphical Web browser interface on PC-based 3270 applications in its new Salvo Server Edition which enters beta test this month. This multiuser version of Salvo runs on a Windows NT server and provides on-the-fly conversion of the host "green screen" to HTML for cleaner, familiar access by PC clients.

Salvo accepts access by browsers running on a variety of platforms, including Unix, the Macintosh and Windows.

Salvo Server Edition will cost \$500 per concurrent user and is expected to ship in the second quarter. The \$49 single-user Personal Edition was released earlier this year. A demo version is available from Simware's Web site at <http://www.simware.com/salvo>.

Frontier grants intranet wishes

Another intranet suite is being shown by Frontier Technologies of Milwaukee, Wis. Intranet Genie is intended as a turnkey starter solution of both client and server software for a functional intranet including Frontier's Windows NT-based SuperWeb Server, browser, Web administration and authoring tools, and electronic mail. Intranet Genie implements Internet standards such as HyperText Transfer Protocol and TCP/IP for easier interoperability and expansion.

Pricing will be announced upon Intranet Genie's release in the second quarter.

©NetManage: (408) 973-7171; Simware: (613) 727-1779; Frontier: (414) 241-4555.

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*In-Stat, Worldwide Enterprise Remote Access Market Share, 1994

*Dell'Oro Group, Worldwide Remote Node Server Market Share, First Half 1995

*IDC, Worldwide Combined Hardware and Software-Based Remote Access Server Market Share, First Half 1995

Technology Update

Keeping Up with Network Technologies and Standards

NETWORK HELP DESK

Network World tracks down answers to your questions. Please submit them to Chris Nerney via phone at (800) 622-1108, Ext. 451, the Internet at cnerney@nww.com or fax at (508) 820-1103.

How can I reestablish my administrator rights on a Novell, Inc. NetWare 4.1 server after having lost them while trying to replicate NetWare Directory Services (NDS) information to a new server on the network? When I attempted to replicate NDS data from an existing NetWare 4.1 server to a new one, I discovered that my Admin object no longer had rights to the root of the NetWare partition. Losing these rights prevents me from performing the operation.

Vince Miele, ESAM, Inc., Grants Pass, Ore.

Be sure that you have the latest DS.NLM and DSREPAIR.NLM files on the existing server, says Ron Nutter, a Master Certified Novell Engineer in the Lexington, Ky., area. If you have to update these files based on what is currently on the server, be sure to run the latest DSREPAIR.NLM program against the NDS database. If you don't have a great number of users on the existing NetWare 4.1 server, you can remove and reinstall NDS using the INSTALL.NLM program. The downside to this option is you will have to recreate all the users, groups, container login scripts and other directory information you currently have.

If the existing server with the NDS data was upgraded from either NetWare 2.X or 3.X to 4.1, you might be able to recover the user information if the bindery files are still present by doing a reimport also using INSTALL.NLM.

As a last resort, you can contact Novell Technical Support. You will probably have to sign a few forms releasing Novell from any potential damage to your server, but depending on the extent of damage to the NDS tree, Novell may be able to fix the problem by dialing in via a workstation connected to the server.

Alternatively, Novell may have to supply a special NetWare Loadable Module with a one-time use license to fix the problem. This NLM will only work while a Novell support engineer is on the phone due to security mechanisms in place within this tool.

IP Multicast apps ride the VLAN infrastructure

By Bob Olsen

The popularity of videoconferencing, whiteboard collaboration and other network-based applications that require point-to-multipoint communication is growing rapidly.

To make these and other emerging multipoint applications possible with the IP protocol, the Internet Engineering Task Force (IETF) has developed a set of protocols and addressing conventions known collectively as IP Multicast (IPmc). Using IPmc, a source application can send out a single stream of IP packets and expect routers and switches to find effi-

cient paths through the network and, where appropriate, copy the packet stream to reach each of the destinations.

■ Special addressing is needed so that one address can represent multiple destinations. IPmc uses IP Class D addresses to identify multicast groups.

■ A membership registration mechanism must allow endstations to enroll in multicast groups dynamically, without administrative intervention. The Internet Group Management Protocol (IGMP) describes how endstations notify the network that they are joining a group.

■ A routing protocol is needed to steer multicast packets to the proper endstations efficiently.

But with local backbone routers being displaced by higher capacity, lower latency LAN and Asynchronous Transfer Mode switches, the duties of IPmc forwarding must now be accepted by switches. Unfortunately most LAN switches today forward multicast traffic indiscriminately. They lack intelligence on how to deal with Layer 3 — network layer — traffic to properly forward multicast frames to just those LAN segments with users registered to receive them.

Instead, the typical LAN switch simply sends each multicast frame out every LAN interface, needlessly propagating

More information on IP Multicast applications on Network World Fusion. Select NetRef, Technology Resources then Internetworking.

<http://www.nwfusion.com>

efficient support for multipoint applications over internetworks. But most LAN switches carelessly distribute it, wasting network bandwidth and other critical resources. Instead, they need to automatically form VLANs based on IPmc group addresses, direct IPmc traffic only to LAN segments with the appropriate group members and let endstations join and leave IPmc groups dynamically.

To make IPmc practical, LAN switches need to:

■ Send IPmc packets only to LAN segments with members of the proper multicast groups. Multicast traffic must not consume resources on segments without group members.

■ Assign endstations to multicast groups dynamically. Endstations must be able to join and leave groups on demand and without the involvement of network administration.

In other words, a switched network should automatically form VLANs that correspond to multicast groups.

If you are planning to run multicast applications over a VLAN, look for switches with Layer 3 capabilities.

Olsen is vice president of marketing for Agile Networks, Inc., a Boxborough, Mass., manufacturer of LAN and ATM switches. He can be contacted by phone at (508) 263-3600, Ext. 103, or via the Internet at bolsen@agile.com.

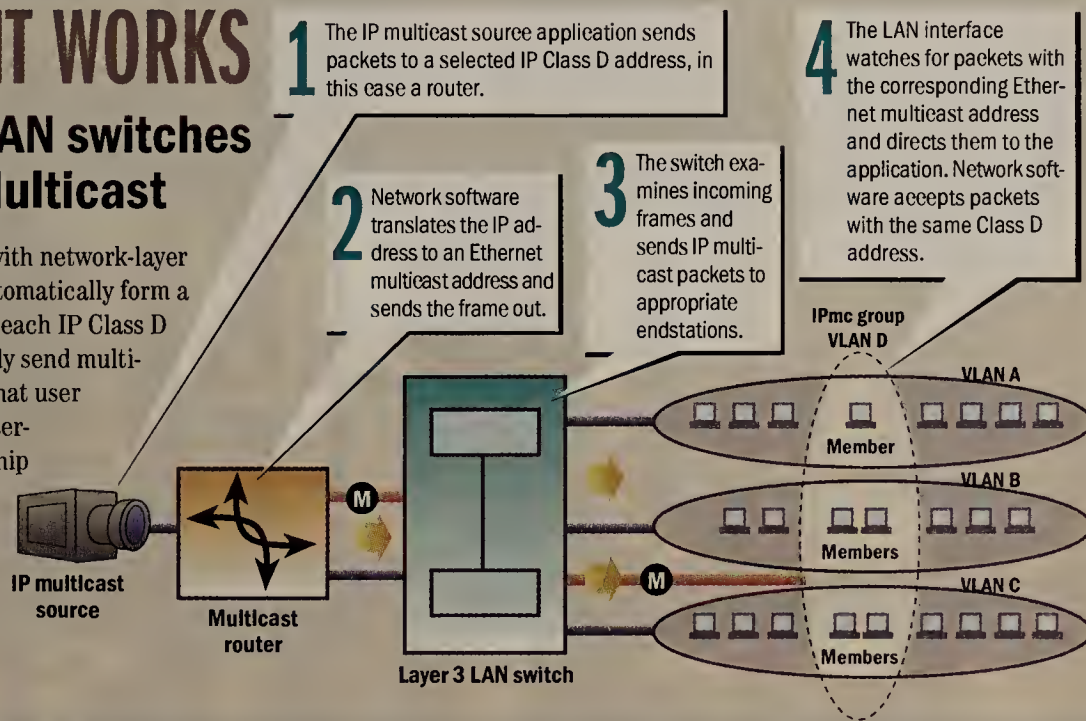
Need information?

Let Network World provide a quick primer on an important or emerging technology. If you have an idea for Technology Update, contact Beth Schultz by phone at (312) 283-0213 or via the Internet at bschultz@nww.com.

HOW IT WORKS

Using LAN switches for IP Multicast

LAN switches with network-layer intelligence automatically form a virtual LAN for each IP Class D address and only send multicast traffic to that user group. They determine membership by examining reports sent out by endstations that want to join the group.



cient paths through the network and, where appropriate, copy the packet stream to reach each of the destinations.

For an IPmc application to operate, it must run on a computer with the IPmc protocol integrated into its TCP/IP stack. Until 1995, TCP/IP implementations with IPmc support were generally limited to Unix hosts.

But all of this changed with Microsoft Corp.'s introduction of Windows 95 and Windows NT and Apple Computer, Inc.'s rollout of MacOS 7.5. Each of these new operating systems implements the IETF's IPmc protocol specification and provides software developers with a convenient, standards-based API.

The IETF has developed standards for IPmc in three critical

Over router-based networks, IPmc routing is defined by the Distance Vector Multicast Routing Protocol. Over switch-based networks, virtual LANs are used to forward IPmc frames to LAN segments with registered users.

Network readiness

To date, routers have been used to intelligently forward IPmc traffic streams through both wide- and local-area backbone networks. Using IGMP and IPmc protocols, routers today optimize the flow of IPmc traffic. They find the shortest paths between source and destination devices and forward multicast packets only to LANs with appropriate group members. LANs without group members are spared spurious traffic.

multicast frames that waste network bandwidth, consume endstation CPU resources and cause multicast storms.

Flooding LAN segments with multicast packets wouldn't create a major problem if the packets were few and far between. But many multicast applications send continuous streams of high-volume multimedia traffic. One user joining a videocast session can unleash a torrent of multicast packets on the entire switch-based network.

LAN switching and VLANs potentially provide an ideal infrastructure for IPmc. In the same way that LAN switches steer unicast packets to the proper LAN segments, they should be able to manage the delivery of multicast packets. IPmc provides

EDITORIAL INSIGHTS

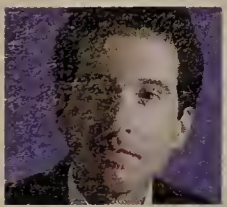
Paying for vanity

If you work for an organization with an 800 vanity number, chances are you oppose the congressional proposal to auction off their new 888 equivalents.

No one wants to pay for something that's always been free or risk having a competitor outbid you for a similar-sounding number, potentially fouling up years of your marketing efforts. So it's with some trepidation that I say this: The auction is not only a pretty good idea, it may be inevitable.

What's going on with 800 numbers is a classic economic shortage. Without an effective rationing method — such as money — the result will be endless disputes and gamesmanship.

A company like I-800-FLOWERS, Inc. (yes, that's the actual company name) can't argue that an auction of the 888 equivalent of its toll-free number is unreasonable when it's clear that the number has monetary value in the marketplace.



Look at the recent federal auctions for broadband wireless licenses. Carriers spent billions for what, so far, is little more than thin air. Surely 1-888-FLOWERS, which would represent a real service on Day One, also has value.

Users are demanding that the government keep so-called number brokers out of auctions, and indeed it should. But it's precisely because numbers are limited that brokers are thriving — just as black markets develop in any economic shortage.

By dropping the idea that everyone who got an 800 vanity number first has a free lifetime right to the equivalents in 888 and every other potential toll-free code, we could finally get the public educated about the new codes and break the fear of advertising them.

Rep. Bill Frisa (R-N.Y.) is trying to steer the issue into hearings so Congress doesn't slip an auction provision into an emergency budget bill passed at midnight. That's a good idea; we really need to hear how the Federal Communications Commission plans to simultaneously auction the estimated 375,000 vanity numbers.

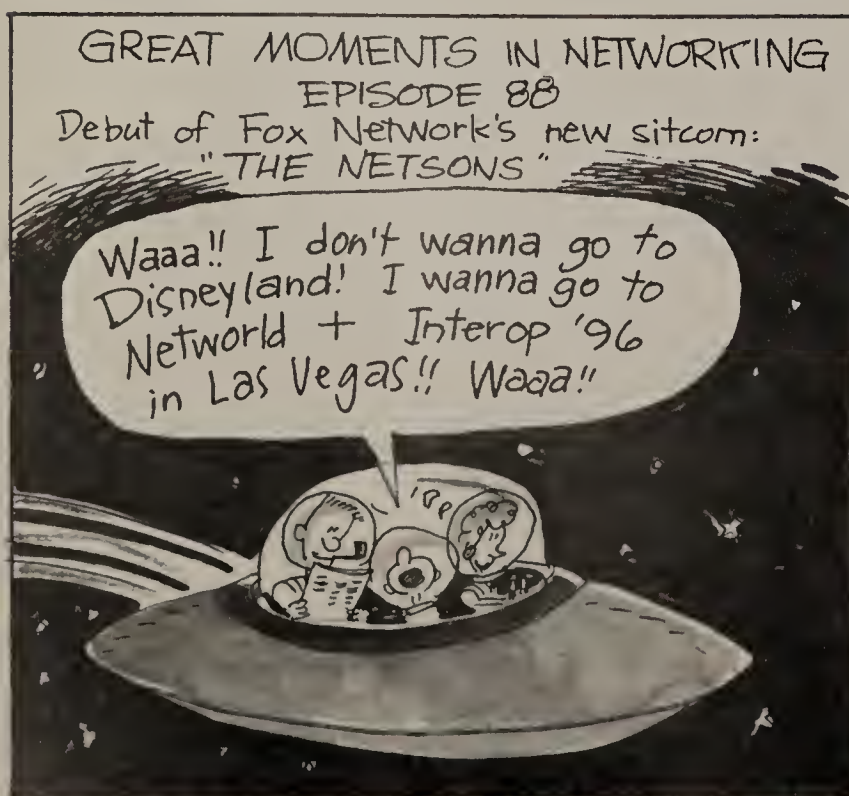
Auctions may be a bitter pill for some companies to swallow at first, but that approach to dealing with the toll-free number shortage may prove to be the best medicine for everyone in the long run.

What do you think?

David Rohde, senior Washington correspondent drohde@nww.com

Teletoons

By Phil Frank and Joe Troise
guru@well.com



The time has not yet come for voice over the 'Net, but keep your ears tuned

The recent flurry of activity surrounding the issue of voice over the Internet has piqued the interest of many network managers. While a group of industry heavy hitters and Internet phone software makers is striving to hammer out standards that would enable products from different vendors to work together, a group of small phone companies called America's Carriers Telecommunications Association (ACTA) is trying to have voice over the Internet banned (NW, March 18, page 1).

For network managers, the real issue is not whether voice should travel on the Internet (it already does from time to time), but figuring out what this means for long-term network investments and procurements. In particular, net managers may ponder whether:

■ Private branch exchanges purchased today will still be viable five years from now.

■ Long-term bulk discount agreements for virtual voice services such as AT&T's Software Defined Network and MCI Communications Corp.'s Vnet will be impacted by failure to meet minimum volume commitments.

■ Capacity planning for corporate Internet access and intranet use adequately factors in real-time interactive multimedia applications that include voice.

Given that work to standardize Internet voice is still very much in progress, the ability to deploy interoperable Internet voice applications on any scale are a minimum of 18 to 36 months away — if the standards process doesn't bog down.

T.120, the International Telecommunications Union standard for data conferencing, and its companion H.323, for audio- and videoconferencing, are really focused on adding Internet voice to the PC and video world, not on replacing the PBX and telephone. The goal of these standards effort, which are supported by the International Multimedia Teleconferencing Consortium (IMTC) — a group of over 100 manufacturers including Microsoft Corp. and Intel Corp. — is to allow users of different operating systems and desktop platforms to communicate transparently. As a result, once products based on these standards become available, the real impact will be in the growth of multimedia applications, not the replacement of the switched voice infrastructure.

The shifting of the majority of voice traffic off of today's switched networks and onto Internet-style, cell-based networks will occur eventually but only after the Internet world solves basic problems concerning reliability, addressing and numbering, universal access, billing and scale. This shift most likely won't occur until the year 2003 or thereafter, at about the time when the current generation of public network switching gear needs to be replaced. By that time, Synchronous Optical Network (SONET) infrastructure and Asynchronous



Mary Johnston Turner

Transfer Mode cell-based networks will be widely available on the public backbones and corporate networks, and it will be no-brainer to run voice over those resources.

In the 2003 to 2010 time frame, the survivors of the coming carrier consolidation war will have figured out the complexities associated with seamless interoperability. Each will

run a commercial-grade Internet subnetwork that transparently links to those of its competitor. Highly reliable, nonblocking Internet service will be widely available. Addressing and directory assistance services will be consistent and accessible. Carriers will have figured out an access charge scheme and voice pricing plans that make sense in a world where voice and data run over the same infrastructure. And the public infrastructure will have developed the switching, transport, customer support and network management capabilities to handle large volumes of cell-based voice.

Only after the above conditions have been satisfied will it be reasonable to discuss wholesale conversion of voice to the Internet. And of course, that won't happen overnight. The legacy switched networks will be supported for years after the general conversion starts.

So network managers need not lose too much sleep over this issue just yet. Bulk service agreements and Internet architectures put in place today should not be affected substantially by this trend for the coming five years. I continue to believe that PBXs will eventually turn into call servers on the corporate intranet, but again, we are looking into the next century before that becomes a large-scale phenomenon. Smaller locations might experiment with LAN-based voice a little sooner if there is sufficient need for multimedia applications.

However, if you plan to have your career last into the next century, you can't afford to ignore Internet voice either.

Keep track of the standards activity by monitoring the IMTC's home page <http://www.csn.net/imtc/>, and as workable products come to market, spend some time getting to understand the new technology. For organizations that plan to make use of a remote workforce in the future, this technology may be a good way to provide higher quality connectivity among the distributed staff.

The major harbinger of the shift to Internet voice is likely to be widespread acceptance of multimedia applications as part of the day-to-day desktop application suite. When you start seeing demand for these applications, it's time to revisit the voice-over-Internet question.

Turner is a vice president at Northeast Consulting Resources, Inc., a Boston-based consulting company. She can be reached at (617) 654-0619 or via the Internet turner@ncri.com.

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Team computing at its most powerful

One cold, windy day in Washington last month, the ARIES project team convened to hammer out the final details of an ATM network it is building.

In an unprecedented cooperative effort, all of the major oil companies and their partners have marshaled their scientific and networking expertise for this project.

Though you would never know it from the sense of calm and confidence at the meeting, the ATM network could revolutionize the way the companies explore for oil in new frontiers, like the deep waters of the Gulf of Mexico.

As discussed in our cover story, geophysicists will be able to immediately share and jointly analyze seismic images with associates thousands of miles away.

The team's vision is to use this network to provide a "virtual joystick" that would let these landlocked researchers actually direct oil explorations as they are happening. Today's method seems laughable in comparison. The data is stored on magnetic tape and shipped - often months later - to a supercomputer center for analysis. By that time, the on-site researchers have long moved from the target area.

This network will help skim many months off the time and money needed for remote oil exploration. So next time you're pumping gas and grouching about the cost, think about the ARIES team and hope that its ATM efforts are successful.

-Beth Schultz

bschultz@nww.com

STAFF

Editor John Dix
Managing Editor Beth Schultz
Art Director Rob Stave
Designer Betsy Hayes

Network World Editor John Gallant
Publisher Colin Ungaro
Production Director Ann Finn

Network World, Inc., 161 Worcester Rd.
Framingham, MA 01701
Phone (508) 875-6400, Fax (508) 820-3467

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By Gary Rowe and Daniel Blum

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In a unique partnering between the oil and communications industries, the ARIES project team pulled together an ATM network that lets companies collaborate on remote oil exploration.



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By Joel Snyder

Picking a calendar manager that spans the enterprise means looking for more than the prettiest GUI.



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At the edge of the Web

The World Wide Web Consortium at MIT recently sponsored a workshop about how the Web can support collaborative efforts. Collaboration caught up with the leader of the workshop, Lotus' Irene Greif, to see what transpired.

DEPARTMENTS

4 Sum of the parts

Conferencing product vendors to stage interoperability demonstration; AT&T to sponsor a special National Information Infrastructure (NII) Award for telecollaboration; Videophones someday may be the answer for team members on the run; A whopping 52% of organizations have employees that work part time from home.

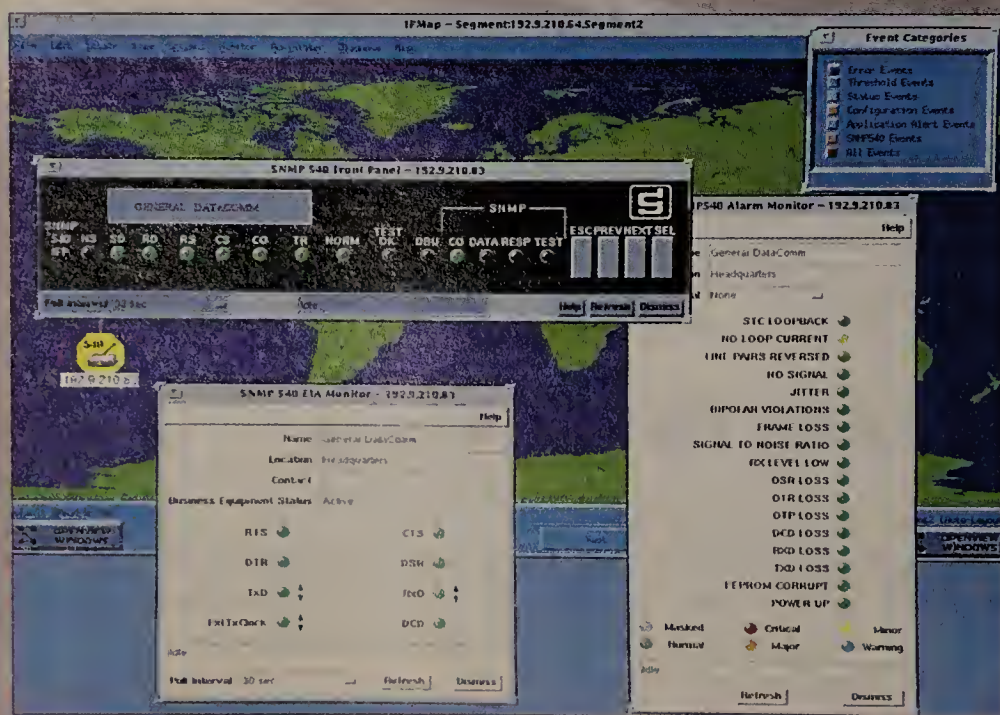
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Why doesn't Microsoft understand groupware? By Jeff Held

The company has been marching toward dominance in almost every area of software, with one notable exception: groupware. Why is that?

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SUM OF THE PARTS

*Tips and tidbits about
collaboration products,
issues and trends*

Conference vendors to demo T.120

Vendors of standards-compliant conferencing products will put their money where their mouth is later this month at an interoperability demonstration being conducted under the auspices of the International Multimedia Teleconferencing Consortium, Inc. (IMTC).

Approximately 30 companies will participate in the demonstration, dubbed Event 120. The demo will show interoperability based on the ITU T.120 standards, says Joe Sullivan, a member of the IMTC and director of multimedia services for ConferTech International, Inc.

The T.120 series consists of application-level and infrastructure protocols. Adoption of the ITU's T.120 audiographic and H.320 videotelephony suites give multimedia teleconferencing equipment manufacturers, developers and services providers a basic connectivity protocol on which they can build products, applications and services, explains the IMTC, which is a nonprofit corporation that promotes international standards for multipoint audio and videoconferencing.

The demo, which will take place in Santa Clara, Calif., is being sponsored by Intel Corp. and Microsoft Corp. "We know this is fairly early in the development cycle for products based on the standard, but we want companies to get together early to work out interoperability issues," says Al Korenjak, engineering alliances manager at Intel.

Korenjak says most vendors do not expect to ship T.120-based products until late this year or early 1997.

Collaboration can be rewarding

National Information Infrastructure (NII) awards program expands with telecollaboration category.

If you've got an interesting collaborative application, organizers of the National Information Infrastructure (NII) Awards program want to hear about it.

The program recognizes the best applications on the NII, which essentially combines public and private networks and the Internet. Winners of NII Awards will be recognized at a ceremony this fall and will be highlighted in a national media and education campaign.

This year, AT&T is sponsoring a

special award for telecollaboration, says Mary Spada, category chair and principal at Global Growth Strategies, a consultancy in Silver Springs, Md.

The AT&T NII Telecollaboration Award will be given for the best example of real-time network collaboration. Entries must show uses of the information infrastructure that im-



prove collaboration across organizations. The application should promote partnering and include such operations as distributed imaging as well as document and information sharing.

"This will bring together a really cool group of applications, like virtual teaming," says Spada.

Companies and organizations must submit their entries by May 1. Information about the program is available on the World-Wide Web at <http://www.gii-awards.com> or by calling (800) 250-2838.

Hey! Is anyone out there?

If you feel like it's getting harder and harder to round up team members for spur of the moment meetings, you're right. A whopping 52% of the organizations surveyed recently by International Data Corp. say they have employees that work at least part of the time from home.

Although many companies still do not condone the practice, the entire work forces of some companies work out of their homes. On average, 12% of the respon-

dents work force telecommute.

"The amount of time that telecommuters spend at home is also expected to rise," IDC says in its report, Mobile Messaging Usage and Preferences — a Demand-side Outlook. While most of the employees that do work at home are only there one day a week, more than a fifth of the respondents already work from home two or three days per week. These numbers will grow over the next 12 months.

PERCENTAGE OF WORK FORCE WORKING AT HOME

% of work force	Today % of repondents	In 12 months % of repondents
0	48	41
1-4	21	16
5-9	9	12
10-19	7	11
20-49	5	9
50-74	5	7
75-99	1	1
100	6	6

AVERAGE DAYS PER WEEK TELECOMMUTERS WORK AT HOME

Days	Today % of repondents	In 12 months % of repondents
1	29	31
2	8	10
3 or more	14	18
None	50	42

Source: International Data Corp., Framingham, MA.

Handy-dandy video phone

When the phone won't do for collaborating with team members on the run, the answer may be the videophone.

Under development by Matsushita Electric Industrial Co. (the parent of Panasonic), the videophone is designed for use with Japan's Personal Handyphone System (PHS), the country's cordless phone system. Although PHS is limited to speech today, extensions for data and multimedia service are in the works.

These extensions have to take into account that PHS channels are only 32K bit/sec. The prototype videophone makes do by using H.261 compression to squeeze video signals down to size and a host of other technologies to overcome the inherent transmission errors common to wireless links.

The result is a 19.6-ounce device with a 2.5-inch color LCD display and a 1/3-inch CCD camera that supports transmission of three to seven frames per second. Functions include picture-in-picture, still mode/holding mode and high resolution mode (352x288).

Future versions could start showing up domestically down the road.



The Great Replication Debate

By Gary J. Rowe and Daniel J. Blum

Replication, Lotus Development Corp. will tell you, separates the men from the boys in the vibrant messaging/groupware market.

But is the company to be believed? Or is replication simply a red herring, a function Lotus is trying to position as a key differentiator as it watches with growing unease the advance of Microsoft with Exchange, Novell with GroupWise XTD and Netscape with its newly acquired CollabraShare offering?

Well, it isn't a fish story, but then again, the replication schemes the other companies are hawking aren't without merit. Notes offers decided advantages, especially as a tried-and-true technology, but the market will probably come to depend on various approaches for different needs.

Replication is critical for messaging and groupware because it enables these systems to consistently represent information to a distributed group of users or applications.

In evaluating how Notes Release 4, Exchange, CollabraShare and GroupWise XTD support (or will support) replication, it is of value to first consider the basic flavors of replication: server-to-server and client-to-server.

The server-to-server category is the core mechanism for ensuring consistent information across your enterprise. Client-to-server replication is also known as in-box replication or local replication.

Particularly valuable to traveling users, in-box replication allows users to synchronize local object stores on their computer with those on a home server. They can then browse a stuffed mailbox, an interesting corporate discussion database or choice bits of the World Wide Web even while flying in an airplane.

RPC vs. messaging replication

Information can be replicated from server to server using one of two approaches: remote procedure calls (RPC) or messaging. Lotus uses an RPC-based model exclusively, while Novell is banking on messaging-based replication. Microsoft and Netscape employ hybrid models that leverage both message- and RPC-based replication.

The RPC model of server replication involves establishing a point-to-point connection between the replicator (server initiating the replication) and the target system. Documents are then updated and an ongoing dialogue ensures the suc-

Is Lotus Notes' replication strength reason enough to shun emerging tools from Microsoft, Novell and Netscape?

cess of the operation. This type of replication is generally conducted on a scheduled basis.

The messaging-based model takes advantage of the vendor's messaging systems. Basically E-mail messages are sent to each target server to be replicated. Replication can be either scheduled or sent as needed to all target replicas to be updated.

Before considering the individual vendor approaches, a few high-level observations about how the two approaches stack up (also see graphic, page 8):

- RPC replication relies on synchronous connections, which means there is some assurance that the replication was properly completed prior to closing the session. Messaging replication does not provide this immediate feedback since it is based on store-and-forward technology.

- RPC replication, given its real-time nature, requires an extensive infrastructure, while messaging-based replication can be built upon existing messaging foundations.

Now let's consider how some of the key messaging/groupware vendors are approaching replication.

Lotus Notes

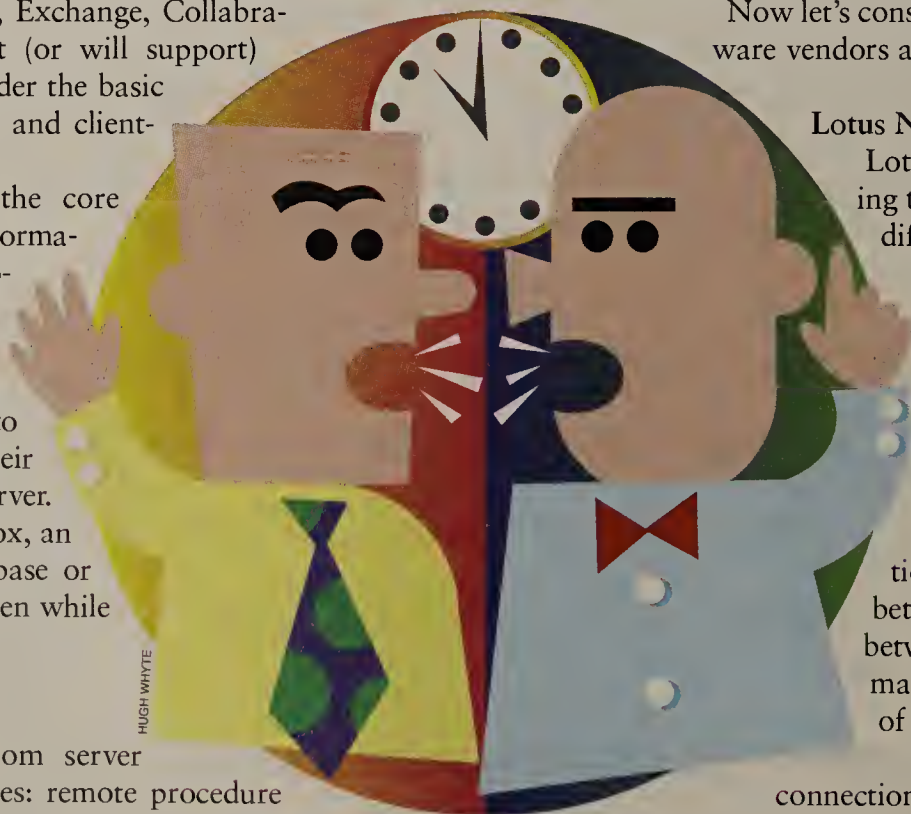
Lotus, the leading force in groupware, is pointing to replication as one of the key features that differentiates Notes from the newcomers, all of which are just now gaining replication in some form or another.

Ken Biscanti, Notes marketing manager, characterizes replication as "the core technology supporting Lotus Notes," and claims that "other vendors are trying to trivialize replication as a check-off item."

Notes is built upon RPC-based replication. This means that a direct link is set up between two servers, a dialogue is established between the machines, and immediate confirmation is available as to the success or failure of the replication.

Replication is based on a point-to-point connection, although it could pass through an intermediate server. Once the connection is set up, the update process can occur in both directions. Note that only the changes are propagated during the replication process.

Lotus, unlike Microsoft, uses the same replication model for all types of replication, including local replication, server-to-server replication and directory updates. Microsoft has one model for replicating public folders and another for synchronizing directories.





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All Notes replication is on a scheduled basis, although Notes users have tremendous flexibility in setting up these schedules. For example, replication can be set by priority, replicating only top-level documents or perhaps only documents from a certain author.

Lotus has enhanced its replication feature set with the Notes Release 4

offering. Key improvements include the addition of field-level replication and support for multiple simultaneous replication sessions.

Field-level replication means that if a remote user only changes one field in a large record, the system will replicate only that field as opposed to the entire record. Depending on the document,

field-level replication can deliver megabyte savings.

Field-level replication, along with Lotus' capability of conducting multiple simultaneous replication sessions, should improve the efficiency of the overall server-to-server replication infrastructure within a company.

Michael Mandelbaum, a vice presi-

dent at Chase Manhattan Bank, is one user looking forward to the enhancement. With a base of 18,000 Lotus Notes users in 40 countries, Mandelbaum says Notes replication has generally met his requirements but can be difficult "to get your arms around in a large environment."

Moreover, any irregularity in a replication cycle has a domino effect on subsequent activities, he says. This could be equated to the effect a car accident has on traffic in a city during rush hour.

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Some important replication questions to ask your vendor

- Can users access an object store on a remote server (e.g., not their home server), or is replication an absolute necessity?
- Are attachments (documents or forms) replicated as well as text?
- Is the replication two-way (synchronizing both sides) and can it warn of conflict?
- Does replication occur at the object store record level, or at the field level?
- Is data transferred by way of messages or some other protocol?
- Is replication at the field level, item level or entire object store level?
- How will replication be administered? Who decides what/when to replicate?

Chase has Release 4 in testing and Mandelbaum is "looking forward to the Release 4 improvements, particularly field-level replication."

Microsoft Exchange

Microsoft will support both RPC and messaging-based replication. RPC replication is supported within a site, which is Microsoft's terminology for an island of high-bandwidth synchronous LAN connectivity. Replication between sites is based on messaging.


Bill Kilcullen, Microsoft's Technical Product Manager on the Exchange Team explains that Microsoft selected this hybrid approach since "you can't always assume that you have the bandwidth for RPC." He emphasized that Exchange's data replication was

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handled separately from directory synchronization.

RPC replication is handled (per Microsoft) in a "near real-time" fashion. A busy server may temporarily refuse replication requests, however, if the target server isn't available. The request is registered in the directory for subsequent follow-up.

Thus, where Lotus allows the administrator to tweak replication schedules, Microsoft's servers attempt to optimize RPC replication automatically. Unfortunately, until users have more production experience with Notes 4 and Exchange, it will remain unclear which approach is best.

Message-based replication between

sites is handled by designating a server as the portal between its site and another site. This server is called a bridge-head server. Replication is handled on a scheduled basis and can use any messaging protocol supported on both connected bridge-head servers. This can include X.400 and the public Internet. Microsoft does allow admin-

istrators to tweak replication schedules for message-based replication.

Other approaches

Novell's GroupWise XTD and Netscape's Collabra Share product also support replication. Collabra Share is a current offering, and GroupWise XTD will be available by mid-1996 with a beta starting this month. Both products are primarily based on messaging replication, although Netscape recently added RPC-based replication to its offering.

GroupWise XTD will differ from Microsoft Exchange in that replication isn't scheduled - items are simply replicated across the messaging backbone as needed.

Eldon Greenwood, Novell's director of product management, says "messaging traffic has a lower priority than information to be replicated."

With CollabraShare 2.1, Netscape offers a replication agent that supports both direct and E-mail based replication. This Replication Agent allows direct replication where a high-speed network is available, and E-mail based replication where LAN connectivity does not exist, over the Internet or where the LAN speed is low.

Netscape's replication functionality can be centralized, if desired, through the use of an agent manager at the central site, or replication agents can be distributed to remote sites.

The Replication Agents support Baranof Software's MailCheck software, responding to mail monitoring "polls" sent out by the MailCheck program. This allows E-mail administrators to monitor the status of Replication Agents from a central graphical interface and to be quickly alerted about any problems.

Replication is, of course, only one of many elements to evaluate when considering a next-generation messaging-groupware platform. It does, however, have a major impact on the quality of data to which users have access.

Lotus is the overall winner in the replication debate. It has, over the years, continued to enhance its replicator. There is no substituting the value of a mature offering that has been gradually enhanced in response to real-world use.

Microsoft, Netscape and Novell also have solid approaches but are rolling out first-generation offerings. However, the use of a hybrid model incorporating the best of E-mail and RPC replication has promise. ■

Rowe (gjrowe@attmail.com) and Blum (dblum@interramp.com) are principals with Rapport Communication, a consultancy specializing in messaging and electronic commerce.

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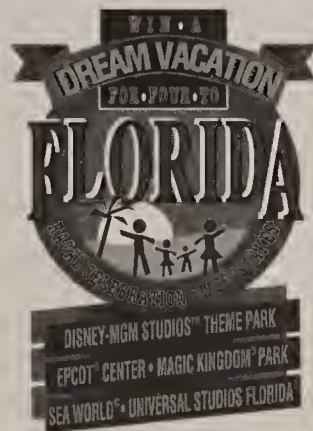
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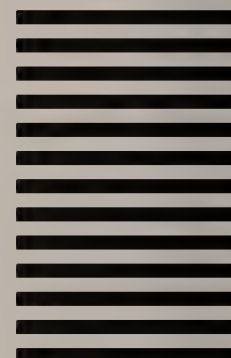


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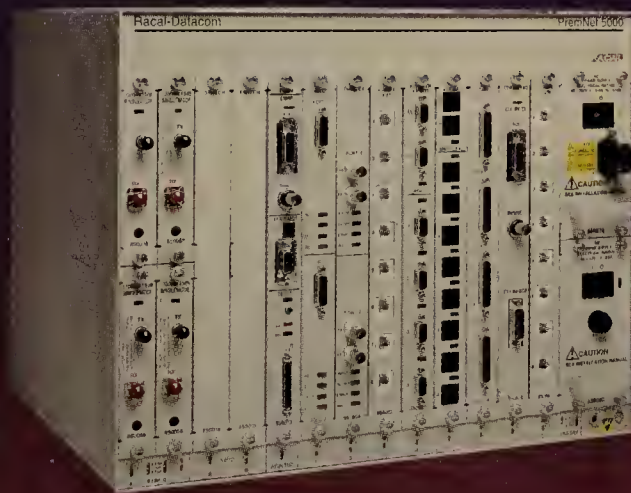


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Communicating through technology

Multimedia chat rooms

ForeFront's new tool brings visual aids to on-line sessions.

By JOHN DIX

TOOLS FOR TEAMS

Need to bring a geographically dispersed team together to refine a design? Try dialing up a teleconference and have the remote folks log into your multimedia chat room via the Web. Participants will be able to view images, exchange files, engage in text chat sessions and interact verbally over the phone.

That's how The ForeFront Group, Inc. envisions customers using the Web and its new Roundtable software, a component of the company's Net Suite line of products.

"When people talk about interactivity on the Web, they are primarily talking about information interactivity; one person dealing with a repository of data," says David Sikora, president of ForeFront. "We're proposing to extend that to allow human interactivity."

This is accomplished using ForeFront's Roundtable client software for Windows 95 and Macintosh desktops, and the company's Conference Server software for Windows 95, Windows NT or Unix. Conference server runs alongside a Web server.

Conferences will typically come together something like this: A team leader will notify participants of a meeting time. At the appointed hour, users will browse the conference Web page which lists live sessions, each represented by a hyperlink. This list is dynamic. As new meetings are created, the Web page is updated accordingly.

Clicking on a session gets the attention of the server, which sends a message back to the browser telling it to load Roundtable, basically as a helper application, Sikora says. The server then establishes the connection and drops the user into the meeting. Roundtable becomes the GUI.

What you get when you enter a meeting is a blank electronic canvas, a roster identifying the other meeting participants and a text chat area. Users can exchange images, documents, messages and other types of files — such as sound clips — all in real time.

"I can take a document from my desktop and drag and drop it

onto my workspace, and you can see it or pull it off and store it," Sikora says.

Roundtable does not, however, let multiple parties manipulate the file, a function Sikora calls application sharing. If participants want to change something being reviewed, they have to download it and work on it using a local application.

True application sharing capabilities are planned for a future release, as is real-time audio support, which would do away with the need for a separate teleconference.

Real-time audio is a feature that appeals to Nancy Butler Songer, director of Kids As Global Scientists, a National Science Foundation (NSF)-funded research project at the University of Colorado School of Education.

But even without audio, Roundtable has a lot to offer.

"We develop educational curricula and learning opportunities for kids and teachers and were looking for a software tool that would allow large, geographically dispersed groups to share multimedia documents," Songer says.

"We haven't seen a tool [other than Roundtable] that could combine that with a chat session. Being able to click on a button and bring a document into a room for discussion is really interesting because there are a lot of education products that are images as opposed to just text."

Although Songer's group has limited experience testing Roundtable internally, she is enthusiastic about the technology because it will enable students to use the Internet to chat about shared images.

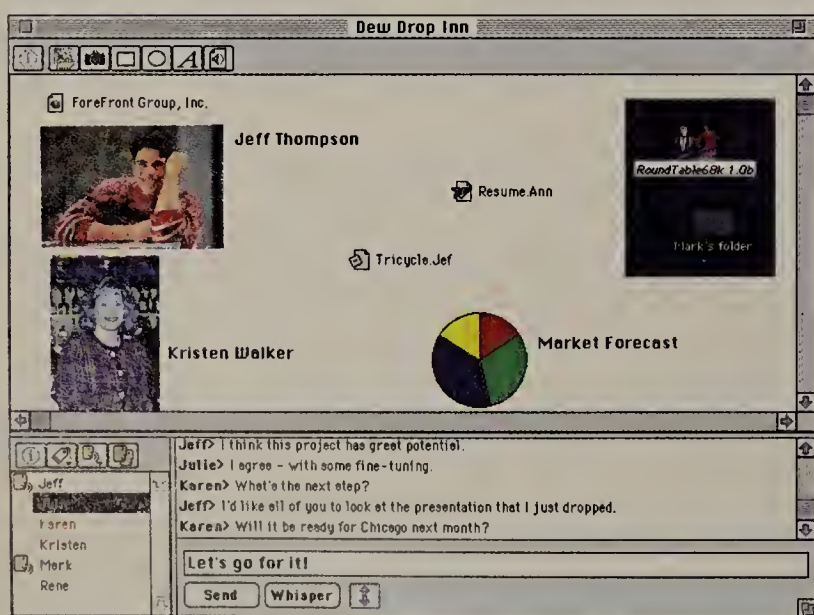
One potential application for Roundtable: teaching kids about weather in a science program. A colleague at the University of Michigan has an NSF research project called The Weather Underground, which has developed Blue Skies visualization software for viewing real-time weather images over relatively low-speed WAN links.

With Roundtable, the students could use the Internet to share the weather images and then discuss what they are seeing.

"If you tell kids we're going to study weather, big deal," Songer says. "But if you say we're going to talk to kids all over the world about weather, that's really neat. It's much more powerful."

Adults aren't supposed to require that kind of motivation. But let's face it, some team members nod off during conference calls. Tools that bring visual aids into the equation should keep things percolating and may spark some new ideas.

Sikora says the Roundtable client software will be distributed free, and Conference Server will probably range in price from \$500 to \$5,000, depending on the number of simultaneous users supported. The product is just leaving beta test. ■



ForeFront's user interface: includes an electronic canvas for multimedia objects, a roster of participants and a text chat area.



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OIL TEAM HITS GUSHER

The ARIES team pulled together an ATM net that lets companies collaborate on oil exploration.



Technical Director Dave Beering: *The ARIES team is pushing technical and political limits.*

Letting their imaginations run wild, members of the ATM Research & Industrial Enterprise Study (ARIES) team dreamed of big ships, far-off satellites and new-fangled network equipment.

The team envisioned building a network that would let an at-sea vessel immediately ship seismic data gathered from scans of the ocean floor's subsurface to a supercomputer thousands of miles away. They pondered how disparate companies could use this network to collaborate on oil gathering and how the industry would change because of it.

Unlike many fanciful imaginings, however, the ARIES dream became reality. Last month, the team installed an Asynchronous Transfer Mode switch, a satellite antenna and other equipment on board a seismic acquisition vessel exploring for oil in the deep waters of the Gulf of Mexico. It then allowed shipboard researchers to send the seismic data to landlocked colleagues for processing.

Installation of the shipboard gear was just the last step in a long series of events leading up to the demonstration. The ARIES team has built an ATM network that spans the country via satellite and terrestrial links (see sidebar, page 16).

"We took something that 18 months ago was literally on a bar napkin and built a prototype configuration involving more than a billion

dollars worth of hardware that has the potential to revolutionize the way the oil industry does exploration," says Dave Beering, technical director for the ARIES project and senior staff telecommunications analyst at Amoco Corp.

Beering, who has been involved with the ARIES project since its inception at Amoco, is still awed by what the team has been able to do and the latitude granted it by industry executives.

"The attitude that pervades the project is: 'I can't believe they're letting us get away with this!'" Beering exclaims. "We're pushing inter- and intracompany models by hooking up different oil companies on the same telecommunications network. There's no precedent for this. It's not only new and different, but it also had been taboo."

Discovery process

The ARIES project dates back to 1993, when network managers and planners at Amoco began assessing the future of company's T-1 backbone. The team determined the company needed ATM, but too many unknowns surrounded the technology so they wanted to closely examine it. That fall, Amoco executives blessed the idea of an ATM research project and Beering and his peers began building a cross-country ATM network.


But the ARIES team had only been given money to buy test equip-

By Beth Schultz



The oil dream team: (front) Dave Beering, Amoco.
(Row 1, L-R) Mike Zernic, NASA; Sleiman Elhatem, Chevron.
(Row 2) Bill Berry, Amoco; David Sims, Schlumberger;
Tim Salo, Minnesota Supercomputer Center; Joe Brewer, Amoco.
(Row 3) Victor Stepanians, Chevron; Larry Flourney, Texas Medical
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*In-Stat, Worldwide Enterprise Remote Access Market Share, 1994

*Dell'Oro Group, Worldwide Remote Node Server Market Share, First Half 1995

*IDC, Worldwide Combined Hardware and Software-Based Remote Access Server Market Share, First Half 1995

Networking for oil

The ARIES team, following 18 months of work, has realized its lofty ambition of building a high-speed network that will let multiple enterprises collaborate on deep-water oil exploration.

This network comprises two critical components, says Dave Beering, technical director for the ARIES project.

"One is the satellite-based piece, which links vessels to the super-computer center. The second is the shared terrestrial network that allows computation, visualization and collaboration across any geography," Beering explains. "The idea is that, based on ATM carrier services, people at different companies can collaborate on these data sets."

The ARIES team has established regional ATM centers in Houston with Teleport Communications Group and in San Francisco with Pacific Bell. The long-distance network, which operates at the T-3 speed of 45M bit/sec, is provided by AT&T and Sprint, Beering says.

Under this scheme, organizations within a region can connect to the center through a local access circuit and converse without traversing a long-distance connection. Both long-distance carriers are connected to the centers, so user companies have their choice of service provider.

The ARIES team plans on building additional centers in Chicago and Washington, D.C., and providing connectivity for sites in Dallas, Los Angeles and New Orleans.

-Beth Schultz

ment and access circuits, not ATM services and switches. "The idea was that we work in an experimental environment with the carrier networks and equipment providers," Beering says.

In other words, the Amoco team needed to partner with carriers and vendors that would donate services and equipment, respectively. "This wasn't anything that looked like an RFP. We recognized that the technology wasn't ready for prime time and that ARIES was going to make it possible to move the technology forward for us as a company and for the [communications] industry," Beering explains.

Amoco built the ARIES network in partnership with 17 companies, including AT&T, Ameritech, Cisco

Systems, Inc., Fore Systems, Inc., General Datacomm, Inc., MFS Communications Company, Inc., Newbridge Networks, Sprint, Teleport Communications Group and WilTel, which is now LDDS WorldCom.

Amoco's ARIES project, which was only funded for one year, culminated in December 1994 with a network

demonstration on Capitol Hill.

The next step

Intrigued by Amoco's work, the American Petroleum Institute (API), picked up responsibility for the project in 1995. "Many of our members are looking at ATM as an information and infrastructure technology. Plus, a lot of money is expended worldwide on seis-

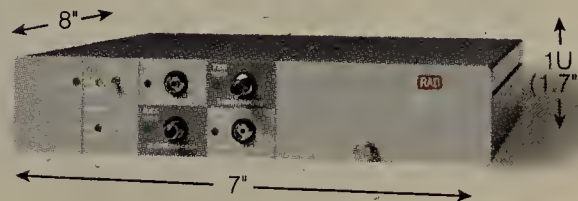
mic data collection," says Ray Cline, director of information systems for the API and an ARIES team member.

ARIES metamorphosed overnight from an Amoco-only undertaking to an oil industry venture. API is a Washington, D.C.-based consortium of about 320 North American companies involved with oil, petrochemicals,

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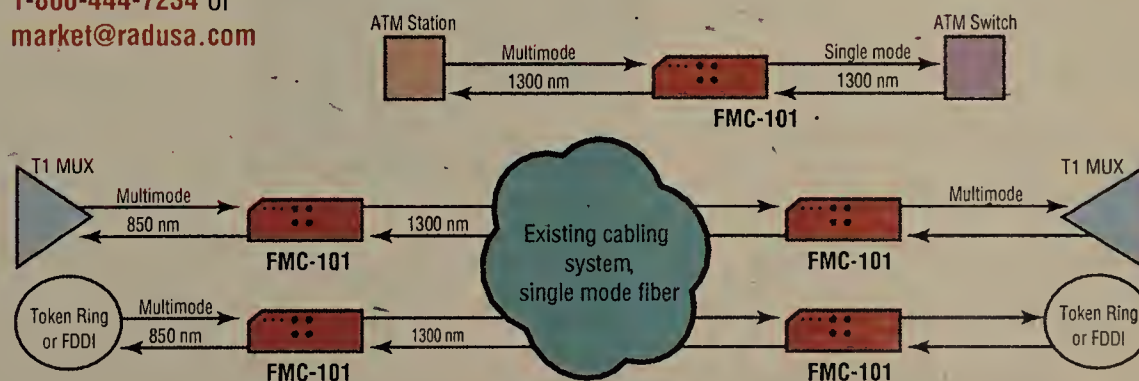


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natural gas or pipelines.

The ARIES team now comprises network managers and researchers from major oil-related companies, including Amoco, Chevron, Geco-Prakla, Schlumberger and Shell, as well as representatives from its carrier and vendor partners. The Department of Energy and NASA also participate

in ARIES, so the team includes folks from national laboratories, as well as from the space agency's Lewis Research Center and Jet Propulsion Lab.

Oddly enough, the team also includes a member of the Texas medical community. "We are working with the medical community to help it under-

stand not only what the benefit is of broadband technology, but how it could actually build networks to support it," Beering says.

Beyond bounds

Collaborative partnerships aren't new in the oil industry, but the ARIES team is really pushing technical and

political limits, Beering says. Before ARIES, an infrastructure that allowed any sort of quality intracompany interaction was nonexistent.

Cross-company teaming is essential when it comes to exploring the new oil frontiers – remote lands like Siberia, Venezuela or the deep waters of the Gulf of Mexico. The capital outlay needed to enter one of these distant regions reaches into the billions or even tens of billions of dollars, so companies must partner, Beering explains.

"The real goal [of ARIES] is to reduce the time to decision for explorations. With higher resolution images and more data, explorers can make better decisions and have successful oil finds," Cline says. "Beering has a vision of a virtual joystick used by guys on the network to control the ship at sea," he adds.

Today's reality is quite different. The lag time from data acquisition to analysis runs from one to two years, Cline says. Researchers store the seismic data on magnetic tapes, which are either flown off the vessel while it is still at sea or crated out once the ship reaches port. Either way, the vessel is long gone before the data gets to the processing center, he says.

The ARIES team has created a communications model that cuts the turn-around time to nothing. That model is pieced together with two critical components: high-speed satellites and ATM. The satellites are needed because of the remote locales, while ATM is necessary because of the massive amount of data that needs to be moved.

The ARIES project relies on NASA's Advanced Communications Technology Satellite (ACTS) program, which typically provides earth stations and satellite time for paid experiments. ACTS is a digital, gigabit-capacity communications satellite, explains Mike Zernic, the manager for high-data-rate experiments for the ACTS program at NASA and another ARIES team member.

Describing the relationship between ARIES and NASA, Beering says: "It provides the satellite to us, which is a resource we as an industry cannot afford to buy, and we provide the technology and applications. It gets a business case."

Zernic says he has never experienced anything like the ARIES project. "It's somewhat rare, at least from a government project standpoint, that we're working this closely with industry to this magnitude of breadth across an industry," he explains.

"The ARIES project has benefited everyone that has been a player," Zernic concludes. "That's why it's been so successful." ■

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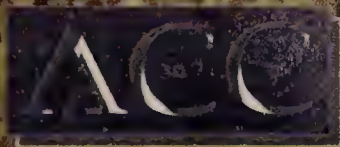
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The dating game

By Joel Snyder

Synchronizing calendars across the wide area.

The Alkwen proposal was coming together on schedule, but Mary in San Francisco needed to double check a few odd pricing details with Elliot in Dallas. And Elliot insisted she pull Boston-based Adrian in on a conference call for final approval before the proposal could be thrown into overnight mail that evening.

But Elliot was no where to be found and he hadn't updated other members of his local team about his plans. With the time zone difference, it seemed more and more likely Adrian would leave the office before Elliot could verify the pricing info.

Mary was going to miss the deadline.

This potboiler may be hypothetical, but the scenario is all too familiar. A relatively low tech tool might have helped Mary avoid the problem and keep her blood pressure in line: a calendar-ing tool spanning the enterprise.

Had Mary been able to log into a corporate calendar and set up an appointment late in the day when both

Elliot and Adrian were available, or even check to see where Elliot was, everything might have fallen into place on time.

Questions to ask before picking an enterprise calendar product

- Does it support true client/server operation and multiple servers?
- How are remote calendars updated, in real-time or using a store and forward technology such as E-mail? Which is most appropriate for your organization?
- Does it support the desktop and minicomputer platforms your company uses? Will it meet the needs of your remote users?
- Can you use your existing network protocols and mail system, or does it require adoption of something special?
- Will all users have to be fluent in English to take advantage of the system?
- Does it have a well thought-out GUI? Will it require significant training?
- Do you get the additional features that you need, such as project management or In/out box?



Picking a calendar manager that spans the enterprise means looking for more than the prettiest graphical user interface. You have to look at performance and scalability, platform options, network and language support, security, and additional features such as project management and real-time updating.

Enterprise-wide scheduling tools are more than personal information managers. They help you track appointments, to-do lists, regularly scheduled meetings and perform other tasks.

Enterprise-wide scheduling tools also enable team members to schedule meetings by scanning for open slots on multiple calendars and track resources such as conference rooms or audio/visual equipment. Schedulers note who is and isn't coming to a meeting and many of them also keep the meeting agenda.

The most obvious difference between workgroup and enterprise scheduling systems is in performance and scalability. To handle very large groups, most enterprise scheduling

packages use a true client/server architecture and timesharing servers, mostly running on Unix and Windows NT.

CorporateTime from Corporate Software & Technologies International, Inc. in Montreal and Synchronize from Crosswind Technologies, Inc. in Santa Cruz, Calif. depend on Unix-based minicomputers to main-

tain back-end databases of scheduling information.

But other products, such as Calendar Manager from Russell Information Sciences, Inc. in Laguna Hills, Calif., achieve scalability by enabling network managers to mix and match servers. Calendar can be deployed on four types of interconnected plat-

forms: Unix-based systems, Digital's OpenVMS, Banyan's VINES, and Novell's NetWare (as an NLM).

Since a single server won't be of much use to large organizations, communications between servers is crucial to keeping calendars up-to-date. Two models are popular: replication and direct server-to-server real-time com-

munication.

The benefit of database replication is that the WAN link between servers doesn't have to be up for a meeting to be scheduled.

But using a store and forward mechanism such as E-mail to replicate databases, as many products do, can result in calendars getting a few hours out of synch. That would make it hard to reliably schedule same day meetings.

In environments where the network is very reliable, a real-time server-to-server connection provides more up-to-date information. Products which support this style are rare: RIS' Calendar Manager is one of the few.

Platforms and networks

An enterprise scheduler is only useful when it supports everyone in the enterprise. Most highend products support the two most popular platforms, Windows and Macintosh, although a few, such as Crosswind's Synchronize, don't support Macs.

Diverse computing styles may call for supporting diverse platforms, such as MS/DOS, X windows or OpenVMS.

Palmtop personal digital assistants (PDAs) are a particularly popular "platform." As people stray further from their desks, the ability to extend the calendaring system to these lightweight tools is becoming more important.

PDA users anxious to link their isolated schedules to the corporate network might look to MSI's CaLANdar, which works with most PDAs in conjunction with an import/export application called Intellilink from Intellilink Corp. in Nashua, NH. Apple Newton users might try Portland-based Now Software, Inc.'s Synchronize.

Other packages, such as ON's Meeting Maker XP have a one-way connection to PDAs: they can export to the PDA, but can't synchronize and reconcile transactions later.

PDAs which run MS-DOS, such as those from Hewlett-Packard, and users who take notebook computers on the road will need remote support. Crosswind's Synchronize is one of the schedulers which allows for "disconnected" operation.

Disconnected operation requires you to take a snapshot of your schedule before leaving the office. When a phone line is available, your laptop and desktop databases will be synchronized.

Most schedulers will send an E-mail message to remind you of upcoming appointments, but MSI's CaLANdar takes it a step further by using mail systems to send appointment requests to users that don't have scheduling tools. With MSI's special E-mail mes-



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sage format, you can send an appointment request to an E-mail-only user who can respond using their normal mail package.

For integration into existing networks, enterprise schedulers should support a variety of protocols. This reflects the realities of global organizations: few companies have standardized on a single protocol.

High end protocol support comes in packages such as ON's Meeting Maker XP, which lets you mix and match IPX, AppleTalk, and TCP/IP pretty much at will.

Security and Languages

Different schedulers offer different security models, but the enterprise-oriented tools support a flexible set of rules which let users define their own scheduling relationships.

For example, you may be able to force appointments onto some people's calendars but have to request permission for others. Proxy support, used when one person manages the calendar for another (such as an administrative assistant), is another fairly standard feature.

As an example of one model, CST's CorporateTime separates privacy issues from permissions to schedule. A CorporateTime user can let coworkers peek at their schedule, deny them access, or provide something in-between called "view busy time only," which shows when you're free without showing what you're doing.

Individual appointments can also be marked private, which blocks access even from users who would normally be able to see the calendar. Scheduling privileges are also easy to customize: you can select who can and cannot schedule meetings with you, along with who can and cannot schedule and accept meetings on your behalf.

Bells and whistles

Some enterprise scheduling tools have their hands full just keeping appointments straight and meetings on-time. However, many offer features which work well in conjunction with scheduling, such as contact management and phone books.

For example, Crosswind's Synchronize integrates a small project tracking and management system with its scheduling system. MSI's CaLANdar offers a pegboard which shows who's in the office (and who's not, assuming that they remembered to update their calendar) along with a real-time chat utility over the network.

Other products add in legacy support to help spread their reach. CS&T has concentrated on helping IBM's Office Vision (PROFS) users migrate to their product, while RIS has built in

continuing support for Digital's ALL-IN-1 community.

Asking a single scheduling package to support an entire enterprise may be too much—for social rather than technical reasons. Some of the schedulers we looked at can scale to a 50,000 user organization. However, it's difficult to imagine that many people

agreeing to run the same package.

The vendors don't seem to care much about this problem, since there is little if any effort to standardize on a single protocol which might allow two different systems to interoperate.

In any case, the perfect scheduler doesn't yet exist. Each of the systems we looked at has some of the features

that an enterprise needs, but none of them cover all the bases.

Finding the package that's right for you will require a careful examination of the exact feature set you need. ■

Snyder is a senior analyst for Opus One in Tucson Ariz: (602) 324-0494 or jms@opus1.com

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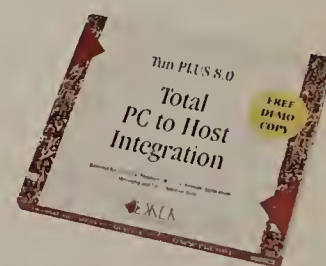
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A G E N D A

MORNING SESSIONS - 9:00-12:15

- **Hype, Health, and Heartache in IT and Communications Markets**
Vicki J. Brown, Senior Vice President
- **The Era of the Wired Consumer: Discontinuity, Opportunity, Success, and Failure**
Frank Gens, Senior Vice President, Worldwide Research
- **The Internet's Impact on Corporate Computing**
David Vellante, Senior Vice President, Systems, Software, & Storage
- **Technologies for the Wired Market**
John Gantz, Senior Vice President, Personal Systems and Collaborative Computing

Session A 1:15 - 1:55	Session B 2:00 - 2:40	Session C 3:00 - 3:40
TRACK 1		
Planet PC: The Global Market Perspective Bruce Stephen	Home Computing: Fitting and Creating Demand Richard Zwetckhenbaum	Mobile Computing and Communications in the Connected Age Randy Giusto • Michael French • Iain Gillott
TRACK 2		
Cyberbucks: Mass Market Retailing Gigi Wang	Application Hosting in the Cyber Millennium Mark Winther • Michael Sullivan-Traimor	CyberAge LANs Lee Doyle
TRACK 3		
Systems & Server Market Dynamics Jay Bretzmann	Will Intel Own the Workstation Business? Dr. Thomas Copeland	Internet Servers of the 21st Century Susan Frankie • Mark Winther
TRACK 4		
Opportunity in Networked Software Dr. Anthony Picardi	Where's the Leverage: Database or Applications? Clare Gillan • Dan Kusnetzky	Can Netscape Break Microsoft's Stranglehold? David Card
TRACK 5		
Developing Channel Partnerships for Superior Service Delivery Traci Bair	Marketing Desktop Services: Hidden Costs No Longer Hidden Kurt Johnson	Distribution in the Era of the Electronic Marketplace To Be Announced
TRACK 6		
Worldwide IT Market Outlook Philippe de Marcillac	Network Computing Challenges in Latin America Paul J. Pastrone	IT Market Restructuring in the Asia/Pacific Region Davis Blair

CLOSING SESSION - 3:55 - 4:40

- **Industry Call-To-Action**
Dr. Robert Metcalfe, Vice President of Technology, IDG; Inventor of Ethernet

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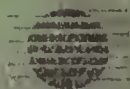


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COLLABORATION
Q&A

While the Web has flourished as a global collaboration tool, it lacks features necessary to support small workgroups. Lotus' Irene Greif discusses her involvement with a Web Consortium workshop examining those shortcomings.



PHOTOS BY SHAWN G. HENRY

The keepers of the Web — The World Wide Web Consortium at MIT — recently sponsored a two-day workshop about how the Web can be used to support collaborative effort.

Who better to lead the workshop than Irene Greif, director of workgroup technologies at Lotus Development Corp. While Greif is intimate with the inner workings of the preeminent collaboration tool, Lotus Notes, her applied research group benefits Lotus as a whole and is not encumbered by the constraints of product development and marketing.

She discussed what transpired at the workshop and some of the thinking about the confluence of Notes and the Web with Collaboration Editor John Dix.

COLLABORATION: Why did the consortium sponsor a workshop on collaboration?

GREIF: It was really interesting to hear that the Web Consortium thought they were not supporting collaboration. The world is telling [Lotus] this story that Notes is dead because of the Web, and here are the people who know the Web as well as anybody saying, 'We don't have any groupware features.'

I think there's been an enormous turn toward new kinds of collaboration using the Web, but I think what is missing is support for small groups and the kinds of things we think of groupware supporting. And that is what the consortium is concerned about because people are beginning to try to do that work on the Web.

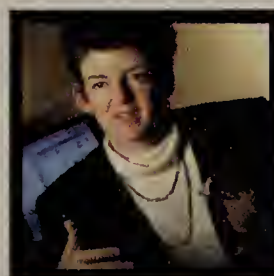
The list of things they imagine they need are all supported in Notes. Whether they are right for the Web or not is a whole separate issue. But what they're saying is the Web is just pages in a file system. We need databases, we need collections, we need a sense of place and things that hang together. We need ways of commenting on things that are there. We need ways of being notified about changes.

One of the things with Notes is the balance between using E-mail and databases, to make sure that things

are stored in a place that makes sense, where people could find out about it, etc.

COLLABORATION: Was the workshop the first the consortium had talked about collaboration?

GREIF: There wasn't a collaboration working group, but there were some collaboration pages at the Web Consortium's Web site that had pointers to people doing annotation servers and various kinds of discussion tools



"It was really interesting to hear that the Web Consortium thought they were not supporting collaboration. The world is telling [Lotus] this story that Notes is dead because of the Web, and here are the people who know the Web as well as anybody saying, 'We don't have any groupware features.'"

and a couple political process sort of systems for large-scale collaboration. So there were a fair number of people who you could say were working in this area, trying to meet particular needs of groups.

But the interesting thing was trying to figure out

whether there really was a niche for the Web Consortium in this. The rationale for inviting me was to make sure it was seen not as just a Web Consortium activity, but something that could be of more general interest.

What we set out to look for were any obvious short-term things that ought to be going into the next specs,

and if there were long-term things that should be addressed.

COLLABORATION: How was the workshop structured?

GREIF: We decided to have a day of demos to see what people had and then a day of discussion. During the demos we tried to keep a list of issues to revisit the

next day. We spent some time the next morning working through some scenarios, trying to get people to think at the application level because there was a tendency to try to go quickly from the set of demos to figuring out the standards issues.

So we broke into groups to talk about a number of application areas

where there might be interesting stories to tell about how people might work if they had a richer set of Web tools. All the stories had in common a sense of process, where you really needed very different tools at different points in time.

In a review process, for example, you might want to be careful about whether reviewers see each other's opinions until after they formulated their own. And then when a judgment is made on a paper and it needs to move through a process, you might need to have them talk to each other.

"The rationale for inviting me was to make sure it was seen not as just a Web Consortium activity, but something that could be of more general interest."

In a standard setting there would be a sense of, are people who are appropriate to bring into the discussion at one point a different set at another point.

COLLABORATION: So how many working groups were formed from the workshop?

GREIF: There were proposals for at least a half a dozen possible working groups. I think probably some of those fizzled even before the end of the day. But some of those that had commitment were notification and annotation.

COLLABORATION: What are those about?

GREIF: If I've published a bunch of Web pages and I'm paying for the service and the disk space that those pages are on, I may not be willing or interested in accommodating annotations. So how is the world going to be organized so that there can be annotations?

Should there be annotation servers that are separate, that are maintained by interested parties, disinterested parties? And how will those annotations be linked to things? I mean, if you write a disparaging comment about something and two days later the document you're pointing to is corrected, is anybody going to notify you, is your annotation going to go away?

So the set of issues around annotations had not only to do with technology, but also issues of service providers and how we could even accommodate these things in the world.

COLLABORATION: And notification?

GREIF: The Web, like Notes databases,

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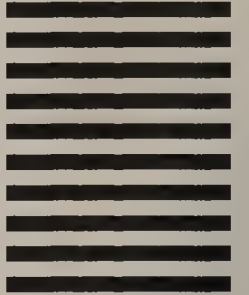
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are passive. It's a great place to put stuff, but how do people find out about it? There's a need for a notification service that would let you know if important changes have stayed, etc. They would let you know when links are not fresh anymore, or maybe something that you're pointing to is changed, so you ought to think about changing your comments. And so...

COLLABORATION: This seems like fairly rudimentary stuff.

GREIF: In some ways, yes. That's not to say that they won't get to a good place eventually, because the Internet and all the various services on it have evolved rapidly. But there are certain gaps that have come to the attention of developers and they are trying to fix them.

Lotus has experience with a complete system that integrates all these things. There are lessons that will be learned over again on the Web as the different technologies fall in place.

COLLABORATION: Generally speaking, where do you think Web technology stands in terms of supporting collaborative environments today?

GREIF: Well, you have to be really clear about which kind of collaboration you mean, because the Web does not have the ability to support small ad hoc groups forming and doing work together, where people know it's private and they can change their mind about exactly who's involved and who isn't and grow their group as they need to and change their work practices without having to shift to a whole new technology. That isn't there.

If you look at wide-scale collaboration on the Web, with people helping other people they've never met, it's a phenomenon we haven't really seen in Notes. Notes is focused on support for small groups and attention is paid to individual organizations and just doesn't lend itself to just putting information out there for anyone.

That's not to say that it can't support this application. And it's not to say that the Web can't evolve a bit to support small groups. But there's something about the nature of the technologies that caused different phenomena.

The other thing is the Web is putting incredible pressures on organizations to gather up information and make it accessible. And it turns out that's a groupware application, that's the stuff that Notes is good at. But it's interesting to see the technologies cause different kinds of things to happen in the organizations.

COLLABORATION: As the Web gets more Notes-like and Notes gets more Web-like, any thoughts on how the products will be used together?

GREIF: It's not at all clear that there has to be a winner or should be a winner. There's no question that a lot of the technologies that are in Notes will be reinvented and reimplemented in different

forms of the Web.

It will be interesting if the Web model of "download a piece at a time until you've got a critical mass of features" draws in different sets of people than Notes has. So the reinventing of technology on the Web might cause it to affect a different set of people.

But I think Lotus is understanding

that and we're trying to make our product more accessible to people of the Internet community and of the Internet mentality. Even if it is something like making an early adopter's version of Notes available on the 'Net or having Notes servers on the 'Net so people could get to their servers with anonymous access. Being part of that



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community so people get the kind of casual exposure they get to things on the Web could make Notes just as accessible to people as the Web technology has been.

We've consistently and deliberately sold into large corporations and business settings. And the Web's taken a very different route. And so they've

had different audiences and different effects on those audiences.

COLLABORATION: Do you see some organizations strictly going one way vs. the other?

GREIF: Even the most committed Notes user is not going to shut their eyes to the Internet. So the question would be

whether people who have been exposed to the Internet only and not Notes will come to appreciate Notes and want to incorporate it as well. And I think that's possible. When I go to a workshop like this and hear the academics and the freeware software people asking for exactly the technologies that I know are in Notes, I think, well, they may need to

hear about Notes and they may want to use Notes.

COLLABORATION: Regardless of the technology, whether it's Web- or Notes-based, how do you see these collaborative tools changing the way people work?

GREIF: Well, with Notes and the Web we are mostly talking about asynchronous communication, people working together without having to be the same time or same place. And what we see over and over again when we look at the people who are successfully using technology, are all sorts of social systems that are really supporting their use of technology.

For example, we looked at the customer support organization here at Lotus to dispel some myths about technology—that maybe we won't need customer support because people will go to the support databases themselves; or maybe the customer support people still have to exist, but they can all work from home and just go to the databases for the answer.

Well, when you watch what's happening you appreciate the limits of technology and the value of people.

In customer support, people call up with the wrong notion of what's wrong and a good support person re-registers the problem and walks them through a discussion. But if somebody with a wrong idea about their problem dove into the best Web search tool or Notes search tool, they'd go down a lot of dead-ends.

Customer support personnel who have access to huge Notes databases full of problem reports also do things all day long like looking over cube walls to find somebody else to ask for advice. So the best customer support person will still ask for advice and want to be pointed places.

So it's clear that the ability to talk to someone face-to-face matters enormously in making it possible to make good use of Notes.

None of these people think they can do their job without Notes and all the databases. But whether they knew it or not, it is also clear they couldn't be doing what they do without the support of other people.

So real time communications, which we're starting to address with Notes, makes an enormous difference. And either we have to find ways to support it by technology, or we have to realize that we're always going to have this interesting mix of people being co-located as well as supported by technology. ■

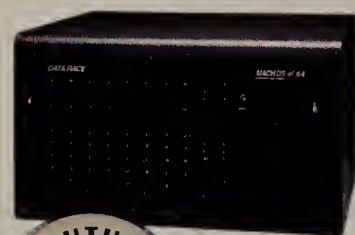
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COLLABORATUS

To have labored together

When it came to groupware, for some inexorable reason Microsoft abandoned its tried-and-true strategy.

Why doesn't Microsoft understand groupware?

BY JEFF HELD

Microsoft has been marching toward dominance in almost every area of software, with one notable exception: groupware. Why is that?

Microsoft is the definition of a marketing driven organization. It has been so successful because of its superb marketing strategy, coupled with enough (mostly) good products to deliver on that strategy. All I know is that when it comes to groupware, Microsoft just doesn't get it.

Microsoft's groupware strategy

If I wanted to be mean, I'd just leave this section blank. However, I will try my best to explain what Microsoft's strategy appears to be. I'm basing my analysis on several things: discussions with Microsoft executives and Microsoft customers, use of Microsoft products and Microsoft's statements to the press.

Microsoft's groupware strategy has been through several evolutions. The first attempt I recall was based on using

Microsoft Office, Visual Basic for Applications and OLE to glue together applications that collectively provide groupware functionality. This strategy never had a chance and sank without a trace shortly after being introduced.

The next attempt was Exchange. Exchange began as a messaging engine, but started to acquire groupware features such as replication and shared folders along the way as Microsoft began to feel more pressure to compete with Notes. Based on the just released Exchange 4.0 (which jumped right to Version 4.0 without the bother of going through Versions 1 through 3) and

Notes Release 4 (which actually did have three prior versions) it is very clear that Notes is years ahead on groupware functionality. Even Microsoft has had to admit this, and recently stated that Exchange is not really the "Notes killer" product that was originally advertised. Exchange is unquestionably a fine messaging engine, however, and should be very successful in that market.

Microsoft's latest strategy, as far as I can tell, seems to be a combination of the first two. Exchange provides the messaging and replication infrastructure, while Visual Basic and Office provide the application capability.

This latest attempt is still pretty weak. Compared to the out-of-the-box capabilities of Notes, the Microsoft solution still seems to require the user to do a lot more work to glue all the pieces together. Microsoft is nothing if not persistent, however, so it may eventually come up with a viable strategy.

In the next two years, however, I don't see anything from Microsoft that will really compete head-to-head with Notes. I also suspect that Microsoft may not even regard groupware as a discrete market anymore, and may decide not to develop a

specific groupware product.

The interesting aspect of Microsoft's latest strategy is that it is dramatically different from the strategy Microsoft has used in other software markets in one key way: It is not emulating existing products. Microsoft has never been shy about adopting features of competitive products, and just doing a better job of marketing them.

In fact, Microsoft's strength has been to take over markets that other vendors have created by building better products. Most of Microsoft's big successes (Word, Excel, Office, Windows 95) followed this pattern. Given that record of success, why didn't Microsoft use the same strategy against Notes? I suspect it would have succeeded.

So the question remains, why doesn't Microsoft understand the groupware market? Unfortunately, I don't have the answer to that one. And neither does Microsoft.

IBM/Lotus update

The news here is mostly good. It appears that the executive departures have run their course, and the new executive team at Lotus is pretty capable.

I have been particularly impressed by Mike Zisman. Of the several times I've heard him speak, he has done a better job of articulating the Lotus strategy than anyone else at Lotus, including Jim Manzi, has done in the past. He also has a very effective speaking style – direct and understanding – that goes over well with customers.

The other good news is that Ray Ozzie has apparently decided to stay on. I've heard the same reports that everyone else has about Microsoft wooing Lotus developers, but I'm not too worried about that. Lotus is situated in one of the great hotbeds of technology talent, so I doubt that the loss of some developers would be crippling.

I'm also pleased to see that IBM is pursuing the strategy of linking Notes to its enterprise products. I discussed this in a prior column, and noted that it would give IBM/Lotus a capability that even Microsoft couldn't touch. The MQ Series looks like a slick way to link into the legacy world without the ugly "screen scraping" approach that is so often used.

I'm also amused at the plans to make the AS/400 a Notes server, but I guess it shows that IBM is serious about integrating Notes into its product line. Of course, while strategy is nice, it's execution that determines winners and losers. Execution was never a strength of the "old" IBM. Let's hope the new IBM does better.

I wonder if anyone at IBM has thought about an MVS Notes server. This isn't as idiotic as it sounds. One of the major problems faced by all large Notes users is maintaining the huge number of servers needed to support tens of thousands of users. Even with the latest Unix boxes, when it comes to raw horsepower, nothing beats a mainframe. ■

Held (jeffrey.held@ey.com) is a partner in the Center for Technology Enablement at Ernst & Young LLP.



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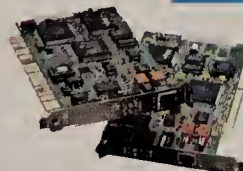


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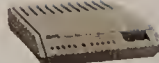
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It's time to give Usenet a much-needed overhaul

One of the most amazing things about the Internet is that it has spanned more than eight generations of computing and grown by over a thousandfold, yet if you choose to, you can still use the same applications that were available at its beginning. It's time to finally retire some of those applications, and a prime candidate is Usenet.

There are two problems with Usenet. First, it just isn't scaling well. As more and more users get on the Net, discussion groups have gotten too active, with some receiving hundreds of postings a day.

Usually, this is dealt with by dividing a group — for example, splitting rec.arts.disney into rec.arts.disney.animation and rec.arts.disney.parks. However, this can only be done so many times before groups become so specific that people can't tell which group they really want. As a result, users cross-post their messages to multiple groups, which makes the problem even worse.

The second and bigger problem is the perception that Usenet is the center of pornography on the Net. Porn FTP and Web sites remain fairly hidden, passed by word of mouth, and most people who aren't looking for them never see them. In contrast, Usenet hangs alt.sex.bondage out there in front of everyone. Is it any wonder that the German government chose this easy target for its first attempt at Net censorship, forcing CompuServe to stop offering sexually oriented discussion groups?

Not only does Usenet hang out the target, but its structure ensures Internet service providers (ISP) assume maximum liability in use of a bull's-eye. Usenet transforms ISPs from common carriers to publishers, making them responsible for Usenet's content.

In other Internet applications, information resides on and is applied by a client's computer. The ISP connects the world to the information, but the responsibility for the content lies primarily with the client.

Usenet, however, presents quite a different story. Its content is replicated on servers that usually are supplied by the ISP. It's a lot harder for ISPs to claim they're not at fault when it's their disks that the porn resides on. Even if the Communications Decency Act is declared unconstitutional, ISPs might be held liable under traditional pornography laws.

There is no easy solution to this problem — if there were, it could have been implemented already. There already are Web sites



Ed Krol

that sponsor targeted discussions on particular topics, a la Usenet, but restrict postings to members of a group. This shuts off Usenet's greatest benefit: the ability to ask a very large community a question. Intelligent agents, which know what you want from the Net and will comb it robotically on your behalf, are too far away from commercial availability to be of use.

Creating Usenet++ requires two developments. First, user-level authentication to discussion repositories is needed. Currently, most ISPs

are only concerned about whether a computer's address is in their news server's subscriber list, not who the person using that computer is. So there is no reliable way of tracing a posting back to an individual. Nor is there any way to say, "These newsgroups are available to adults and these to children" if they are using the same terminals for access.

The second development needed is the ability to put custom personal filters on the full text of a message. Currently, when a newsgroup is accessed, only the headlines are sent to the applications software. This allows some filtering, but it is only accurate if the headline adequately describes the message's content, which often is not the case.

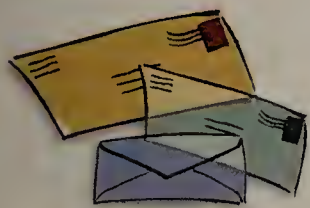
Users need to be able to give a set of selection criteria to their server, which would then screen messages and send only the ones that fit the criteria. This would solve many of the traffic problems we see today, as well as many of the objectionable content issues that have caused knees to jerk in Washington, D.C.

The first part of the solution is easy to achieve. Unfortunately, the second part is not. The ability to categorize natural language is not easy, and processing it is processor intensive. The filtering must be done on the provider's computer, which would add to the cost of the service.

Although the cost of this new and improved Usenet would be necessarily higher, the savings in time and aggravation would make it worthwhile. Then, finally, we could allow its predecessor to be put to a well-deserved rest.

Krol is author of The Whole Internet for Windows 95 (O'Reilly & Associates, Sebastopol, Calif., 1995) and assistant director for network information services at the University of Illinois at Urbana-Champaign. He can be reached at e-krol@uiuc.edu.

MESSAGE



QUEUE

Play off Warp Server

Regarding your article "OS/2 Warp Server enters the ring" (Feb. 26, page 8):

Why is it that articles discussing OS/2 Warp Server use words like "much ballyhooed," while articles mentioning Windows NT or Windows 95 use terms like "long-awaited?" Could it be media bias? Nahh.

Robert Pili
Project specialist
Blue Cross and Blue Shield of Massachusetts
Boston

I have to say that I am a little shocked at the misinformation in your "Wired Windows" column on OS/2 Warp Server (March 4, page 30).

Either Dave Kearns hasn't used Warp Server or doesn't understand the current state of today's networking market. Perhaps both.

Warp Server is not the ultimate network product. But it is a wonderful hedge for companies that want a single platform for both file and print services and as an application server. NetWare may be better at file and print services and Windows NT may be better at serving applications, but Warp Server is the perfect balance for companies that seek to do both.

I cannot predict whether a product will be successful. However, our company is a provider of technical consultants for all the major networking platforms, and since the beta of Warp Server began last August, we have had increasing requests for OS/2-experienced individuals to test and implement such a single-platform strategy. Some of our clients just don't want the headache and high costs of supporting multiple

server platforms any more than they want to support multiple desktop platforms. Based on this interest, Warp Server has very high potential.

Timothy Weaver
Corporate account manager
Newport Technical Services
Irvine, Calif.

I am simply enraged by your "Wired Windows" column on Warp Server. To say Warp Server offers little more than NT or NetWare 2 is like saying a Lexus LS300 offers little more than a Chevy Corsica.

The list of features in Warp Server as compared to its competitors is decisive. May I suggest that Dave Kearns get out of his Microsoft pamphlets and into the real world.

Jonathan Judge
Appleton, Wis.

Your "Wired Windows" column on Warp Server was not news; it was propaganda. In today's information blitz, it is very hard for networking professionals to pull

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Contributing Editors

Daniel Briere, David J. Buerger,

Mark Gibbs, James Kobielus, Edwin Mier,

Mark Miller, Alan Pearce

Buyer's Guide Contributors

Mary Petrosky, The Burton Group; Tony Croes, Linda Musthaler, Josh Penrod, Currid & Co.; Mark Miller, OligNet Corp.; James Kobielus, LCC, Inc.; Mike Marburg, META Group Global Network Strategies; Edwin Mier, Mier Communications, Inc.; Joel Snyder, Opus One; Daniel Blum, Gary Rowe, Rapport Communication; Daniel Briere, Christopher Finn, Christine Heckart, Mark Langner, TeleChoice, Inc.

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Should you buy remote access products from your backbone supplier rather than a remote access vendor?

Whether your remote workers are on the road, at home or in a branch office, figuring out how to support access to the enterprise network is a big decision. Choosing a solution from your backbone supplier rather than a remote access vendor offers you three main advantages.

First, backbone suppliers offer one-stop shopping and customer service. Networks have many small, vital parts that must work together yet sometimes don't. Remote access applications tend to increase network complexity, requiring that you implement full-strength tools for management and security. It's not uncommon to make trips to several different stores before you have everything you need.

A one-stop shop that provides all the high-performance equipment and management tools needed for the LAN/WAN extensions and remote end users can make your job infinitely easier. And when you do need some help, support for your network and end-user base is only one phone call away.

Second, your backbone supplier can ensure the performance of its remote access solutions remains consistent as your network grows.

Growth will continue to be a law of networking. The corporate remote access system that was initially used by the sales force for light electronic mail communication is now being used for telecommuting, branch office connections and Internet access.

It's important to consider this growth when designing your network support model, especially when doing budget and resource planning.

This is where working with a vendor that has demonstrated LAN, WAN and remote access expertise can make the difference — by understanding how remote access fits into your larger enterprise network.

Third, your backbone supplier owns a portfolio of capabilities beyond remote access servers that you can leverage as your network grows. With a heritage of providing enterprise system solutions, backbone suppliers also can provide a better migration path for your growth.

For example, suppose you are considering adding switching to your remote network. Backbone suppliers, which already own core switching in the LAN, can deliver these products for remote access applications much more quickly and cost-effectively.

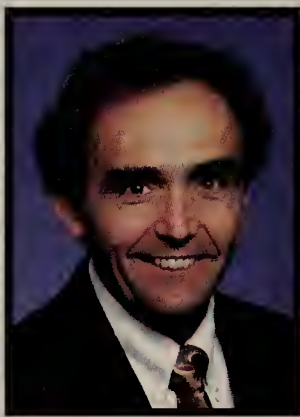
By working with a backbone supplier, you will gain the flexibility to add new capabilities to your network on demand. Remote access vendors can't provide this level of support.

From the open systems perspective, backbone suppliers offer a broader range of network and security interoperability. For instance, while remote access vendors may support only the most popular network operating systems (i.e., Ethernet, token ring and AppleTalk), a total network provider also will support Banyan VINES and Digital Equipment Corp.'s DECnet.

The same thing goes for security offerings. Enterprise networking companies are more apt to have several options for implementing security procedures. The key is ensuring that the vendor you choose can support any and all security arrangements you already have in your network operating system and routed network.

Evaluate the importance of acquiring all your networking products and services under one roof. Consider the management, security and performance factors needed to accommodate an ever-increasing remote user population.

Finally, anticipate your migration needs and recognize the importance of open standards. You'll conclude that your backbone supplier is best suited to meet your remote access needs.



Steve Russell

Remote networking is a distinct market with its own economics, technologies and view of user needs. While backbone suppliers tout the convenience of one-stop shopping, they cannot meet your remote access requirements because they don't fully understand them.

The economics of backbone and remote networking are nearly polar opposites. In the backbone environment, cost of acquisition is more critical than cost of ownership. The equipment needed to meet users' ever-increasing bandwidth requirements costs a lot to build but once installed, is relatively inexpensive to run — you don't get a bill for cramming more packets through your own cabling. You can buy \$2 million worth of incremental Cisco Systems, Inc. routers and spend about \$200,000 a year to run them.

In the remote world, cost of ownership exceeds cost of acquisition. It doesn't take a lot of expensive gear to achieve reliable performance.

However, every connection involves the use of a tariffed WAN infrastructure; at some level, every packet generates a phone bill. You can buy \$200,000 worth of remote access equipment and generate \$2 million worth of phone bills. You may be willing to accept this in exchange for the productivity gains and return on investment you'll receive, but you want a vendor that is single-mindedly focused on lowering your operating costs.

There is also a huge contrast between the fundamental technology requirements of remote networking and those of the backbone environment. Remote networking opens the backbone to thousands of individual packet-over-circuit connections made across unknown third-party switch fabrics. Vendors must make a major investment to acquire the knowledge and develop the technology to deal with issues such as security, telco switch types and phone-line quality.

Remote access vendors already have expertise in WAN service selection, optimization and management; data compression and circuit path prioritization; and spoofing and virtual connections. Backbone vendors do not.

But perhaps the most dramatic difference between the remote networking and backbone markets is the prominent role end users and PCs play in remote networking. Most backbone vendors see the PC as simply a TCP/IP address and a packet generator. Remote access vendors put the end user on center stage. They are committed to providing client software that's easy to install and use, supporting operating system upgrades and new modems, and conducting interoperability tests between their products and popular applications and networking software.

What's implied by one-stop shopping is a vendor's ability to offer an integrated vision, architecture, product development organization and customer support. The customer benefits from better interoperability, easier deployment and upgrades, and more security about an unpredictable future.

These are good things. But they aren't achieved by buying up 15 companies — they come from hard, disciplined product architecture and integration focused on meeting users' specific needs.

Offering a full line of equipment to users is important as long as it's equipment that belongs together for sound economic and technical reasons. Remote networking is a corporate phenomenon that enables critical new business strategies and increases employee productivity.

Working with a vendor that is completely dedicated to understanding this phenomenon and supporting whatever third-party equipment, standards and software are necessary to facilitate it, will deliver solutions more quickly and provide you with more choices now and in the future.



Frank Ingari

Russell is vice president and general manager at 3Com Corp. in Santa Clara, Calif. He can be reached at (408) 764-5000 or via the Internet at Steve_Russell@3mail.3com.com.

Ingari is president and chief executive officer of Shiva Corp. in Bedford, Mass. He can be reached at (617) 270-8320 or via the Internet at Fingari@Shiva.com.

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*As CFO, Bill saw that AS/400 Advanced
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the information he needed, at a moment's
notice. And at less cost to the company.*

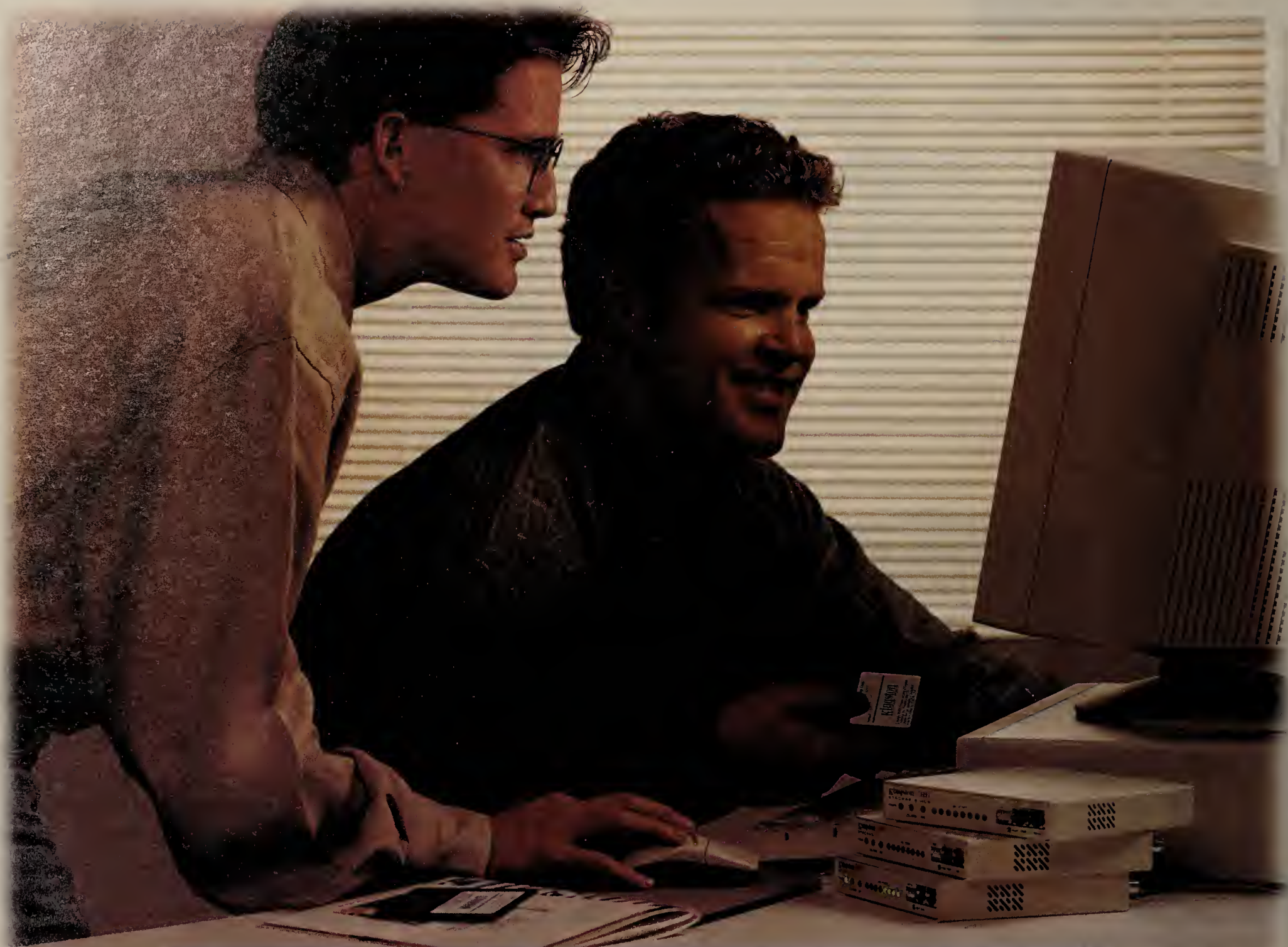
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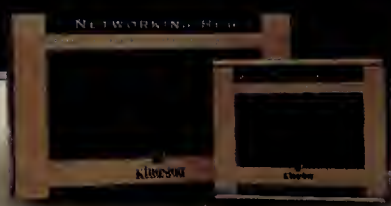


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Low-end hubs look for

Buyer's
Guide

R-E-S-P-E-C-T

Outfitted with new features and functions, stackable and chassis-based models alike are kicking and screaming for your attention.



FRED HILLARD

By Glenn Gabriel Ben-Yosef

Top-tier stackable hub vendors are giving a good, swift boot in the backplane to their small chassis-based hub competitors as they battle to get noticed as viable players in the low end of the enterprise market.

In many cases, they deserve your attention. A growing number of stackables today can be wired together to create a sophisticated backplane that supports distributed LAN segmentation in much the same way as a chassis-based product.

It's also now possible to load up top-of-the-line stackables with the type of internetworking and other advanced capabilities that were once the exclusive domain of chassis-based hubs.

Hewlett-Packard Co.'s AdvanceStack Hub line, for example, comes with one or two expansion slots that can be populated with advanced management, bridge, router, LAN switching, WAN connectivity and high-speed Asynchronous Transfer Mode switch uplink modules. General Technology, Inc. also

Form as factor?

For some users, it's not always the advanced features and functions in a low-end hub that count. Rather, it's the unit's physical size — or form factor, as marketers call it. But should size count that much?

To some extent, the form factor will always play a role in your purchase decision. Wiring closets are often well suited for rack-mountable chassis or stackable products. Smaller offices that have limited or no wiring closet space may do better with an attractive desktop hub.

Due to their modular designs, chassis-based hubs typically offer more technology options, such as integrated bridging/routing or SNA connectivity, but they may take up a little more room than stackables. However, that's beginning to change as vendors such as Digital Equipment Corp., with its DEChub 90, enable you to mount the chassis on a wall to save valuable floor space.

Meanwhile, stackable vendors are ship-

ping units that rival the functionality of low-end chassis-based products but take up much less space.

So rather than concentrate on size, identify the functions that you require and look at both stackable and chassis-based models.

In small workgroups, the low per-port price of stackables will probably be the determining criterion. But if you're looking for high fault tolerance and redundancy, few stackable solutions can compete with more expensive low-end chassis.

A low-end chassis-based product from one of the high-end hub vendors may be the ticket if you need to integrate special services such as enterprise management, virtual LANs, switching, SNA or Asynchronous Transfer Mode in a single unit, or if you have a pervasive single-vendor internetworking strategy. Just make sure you clear out enough space.

— Glenn Gabriel Ben-Yosef

Low-end hubs

Company	Product	Type	Backplane				Ports per unit		Other services			Management				Cost		
		C = Chassis: Max. no. of slots S = Stackable: No. in stack	Number	Shared bus	Switched	Speed (bit/sec)	LAN type: Max. number		Bridging	Routing	Terminal server	Managed units in stack	S1 = SNMPv1 S2 = SNMPv2	RMON	Bridge MIB	Repeater MIB	Router MIB	Price/ Warranty (months)
ADC Fibernux (818) 709-6000	Crossbow	C: 14	5	✓		224M	10M bit/sec Ethernet: 216; token ring: 156		✓		✓	NA	S1		✓	✓		\$2,500-\$25,000/24
Allied Telesyn International Corp. (800) 424-4284	3600 Series Hubs	C: 8	1	✓	✓	10M, 80M (1)	10M bit/sec Ethernet: 199					NA	S1					\$995-\$2,495/Lifetime
	TurboStack Series Hubs	C: 8 S: 8	1	✓		10M-80M	10M bit/sec Ethernet: 199		✓			8	S1	✓				\$1,455-\$4,155/Lifetime
Asante Technologies, Inc. (800) 662-9686	AsanteHub 2072	C: 7	1	✓		10M	10M bit/sec Ethernet: 72		✓			NA	S2		✓	✓		\$1,099-\$7,844/Lifetime
	Netstacker	C: 2 S: 3	1	✓		10M	10M bit/sec Ethernet: 24		✓			1	S2		✓	✓		\$300-\$5,997/ Limited lifetime
Bay Networks, Inc. (800) 776-6895	Baystack 10Base-T Stackable Hub	S: 10	1	✓		10M	10M bit/sec Ethernet: 24					10	S1	✓				\$899-\$4,497/12
	System 2000 Hubs	S: 5	1			10M, 16M or 100M	10M bit/sec Ethernet: 16; FDDI: 14; token ring: 16					5	S1	✓				\$799-\$15,995/12
Cabletron Systems, Inc. (603) 332-9400	MicroMMAC-E and MicroMMAC-T	S: 5	1	✓		10M or 16M	10M bit/sec Ethernet: 26; ATM: 1; FDDI: 1; token ring: 24		✓	✓	✓	1	S1	✓	✓	✓		\$4,895-\$7,795/3
Canoga-Perkins (818) 718-6300	8830 Multiport Repeater	S: 7	1	✓		10M	10M bit/sec Ethernet: 14					1	S1			✓		\$2,555-\$5,855/12
Cogent Data Technologies, Inc. (800) 426-4368	S-Series S-800 FX	S: 5	1	✓		100M	100M bit/sec Ethernet: 8		✓									\$3,998/60
	S-Series S-1200 family	S: 5	1	✓		100M	100M bit/sec Ethernet: 12		✓									\$1,998-\$2,098/60
Compaq Computer Corp. (800) 544-5255	Netelligent 2008 and 2016 10Base-T Repeater	S: 10	1	✓		10M	10M bit/sec Ethernet: 16		✓			10	S1			✓		\$570-\$760/36
	Netelligent 3015 and 3115 10Base-T/FL Repeater	S: 5	3	✓		30M	10M bit/sec Ethernet: 15					5	S1			✓		\$1,300-\$1,500/36
	Netelligent 3024 and 3124 10Base-T Repeater	S: 5	3	✓		30M	10M bit/sec Ethernet: 24		✓			5	S1			✓		\$940-\$1,219/36
Compex, Inc. (800) 279-8891	MicroHub Plus family	S: 4	1	✓		10M	10M bit/sec Ethernet: 13					4	S1	✓		✓		\$169-\$299/24
Computer System Products, Inc. (612) 476-6866	Stackup II Series	S: 5	1	✓		10M	10M bit/sec Ethernet: 24					5	S1			✓		\$559-\$895/ Limited lifetime
Connectware, Inc. (800) 357-0852	EtherStack Hubs	S: 7	1	✓		10M	10M bit/sec Ethernet: 24					7	S1	✓		✓		\$1,365-\$3,595/12
	MicroStack Hubs	S: 4	1	✓		10M	10M bit/sec Ethernet: 8					4	S1			✓		\$295-\$495/12
	10Base-T Workgroup and Expansion Hubs	S: 2	1	✓		10M	10M bit/sec Ethernet: 24					2	S1			✓		\$995-\$2,290/12
Digi International, Inc. (800) 344-4273	MIL-4510H/MIL-4511H	S: 10	2	✓		10M	10M bit/sec Ethernet: 26		✓			2	S1			✓		\$1,199/60
Digital Equipment Corp. (800) 457-8211	DEChub 90	C: 8	1	✓		10M	10M bit/sec Ethernet: 128		✓	✓	✓	NA	S1	✓	✓	✓	✓	\$790-\$6,790/12 (3)
	MultiStack System	S: 16	1	✓		10M	10M bit/sec Ethernet: 16; FDDI: 1		✓		✓	16	S1	✓	✓	✓	✓	\$795-\$12,125/12 (3)
D-Link Systems, Inc. (800) 326-1688	DE-2200L	S: 5	1			10M	10M bit/sec Ethernet: 12		✓		✓	5	S1		✓	✓		\$1,595/12
General Technology, Inc. (800) 274-2733	HubMaster II	C: 3 S: 30	1	✓		NA	Token ring: 36 (4)					30	S1					\$3,299-\$7,246/12
Hewlett-Packard Co. (800) 533-1333	AdvanceStack Hub family	S: 16	1	✓		10M	10M bit/sec Ethernet: 48		✓	✓		16	S1		✓	✓	✓	\$849-\$3,119/Lifetime 5-year on site
	AdvanceStack 10Base-T Hub-8E	S: 30	1	✓		10M	10M bit/sec Ethernet: 8					30						\$199/Lifetime
	AdvanceStack 100VG Hub family	S: 16	1	✓		NA	100VG-AnyLAN: 16		✓	✓		16	S1					\$2,159-\$3,199/Lifetime
IBM (800) 426-2255	8224 Ethernet Stackable Hub	S: 10	1	✓		10M	10M bit/sec Ethernet: 16					10	S2			✓		\$895-\$1,395/12
	8238 Token Ring Stackable Hub	S: 8	1	✓		NA	Token ring: 16					8	S1	✓				\$3,565-\$5,665/12
Intellicom, Inc. (818) 407-3900, Ext. 1	OfficeStak 600	S: 5	1	✓		10M	10M bit/sec Ethernet: 13			✓		5	S1		✓	✓	✓	\$899-\$3,771/36
	OfficeStak 5000	C: 24	5		✓	600M	10M bit/sec Ethernet: 108 100M bit/sec Ethernet: 12			✓		NA	S1	✓	✓	✓	✓	\$1,395-\$20,000+/36
LANart Corp. (617) 444-1994	SegWay	S: 5	8	✓		80M	10M bit/sec Ethernet: 24					5	S1	✓		✓		\$1,995-\$9,175/60
Lancast (800) 952-6227	SuperHub 5000	C: 12	6		✓	72M	10M bit/sec Ethernet: 264; token ring: 132		✓			NA	S2		✓	✓		\$3,700-\$15,000/36
LanOptics, Inc. (800) 533-8439	StackNetPro	S: 6	1	✓		10M or 16M	10M bit/sec Ethernet: 24; token ring: 24			✓		6	S1		✓			\$2,359-\$9,600/36
	StarNet	C: 12	4	✓		36M	10M bit/sec Ethernet: 288; token ring: 288		✓			NA	S1		✓			\$3,000-\$43,000/36
Madge Networks, Inc. (800) 876-2343	SmartCAU Plus/SmartLAM	S: 4	NA	NA	NA	NA	Token ring: 20					4	S1, S2	✓				\$5,000-\$11,000/12
	Smart Ring Access Module family	S: 3	NA	NA	NA	NA	Token ring: 20					3	S1, S2	✓				\$3,700-\$3,900/12
Network Peripherals, Inc. (408) 321-7300	NuSwitch Fast Ethernet Switching Hubs	S: 12	1	✓		200M	10M bit/sec Ethernet: 12; 100M bit/sec Ethernet: 5		✓			12	S1			✓		\$2,995-\$5,995/12
	NuSwitch FDDI Switching Hubs	S: 100	1	✓		200M	10M bit/sec Ethernet: 12; FDDI: 6		✓			100	S1			✓		\$4,995-\$10,995/12
Plexcom, Inc. (800) 753-9526	Plexnet CC8000 Multimedia LAN Concentrator	C: 14	14	✓		225M	10M bit/sec Ethernet: 259; ATM: 224; token ring: 196		✓		✓	NA	S1	✓	✓	✓		\$1,000-\$25,000/12
	PlexStack 4000 Series Stackable Hub family	C: 3 S: 8	1	✓		40M	10M bit/sec Ethernet: 39 (5)		✓			8	S1	✓		✓		\$800-\$3,520/60
	PlexStack 4206 Series Fiber Optic Stackable Hub	S: 8	1	✓		10M	10M bit/sec Ethernet: 7		✓		✓	8	S1	✓		✓		\$1,695-\$2,720/60
	PlexStack 4800 Token Ring Concentrator	C: 4 S: 8	4	✓	✓	64M	Token ring: 48		✓			8	S1	✓	✓			\$1,500-\$6,000/12
	PlexSwitch 5108 10Base-T Switching Hub	S: 128	4		✓	80M	10M bit/sec Ethernet: 8; 100M bit/sec Ethernet: 1; FDDI: 1		✓			128	S1		✓			\$3,250-\$6,245/12
Proteon, Inc. (800) 545-7464	ProNet/E Series 80	S: 10	1	✓		100M	10M bit/sec Ethernet: 16						S1			✓		\$699-\$1,299/12
	ProNet 4/16 Series 70	S: 18	1	✓		16M	Token ring: 8					18	S1			✓		\$995-\$1,295/12
	ProNet 4/16 Series 75	S: 16	1	✓		16M	Token ring: 16					16	S1			✓		\$2,000-\$3,500/36
	Series 90	C: 10	4	✓		52M	10M bit/sec Ethernet: 100; token ring: 100		✓	✓		NA	S1		✓	✓	✓	\$2,820-\$32,450/12
RAD Data Communications, Inc. (201) 529-1100	FDX-100 Modular FDDI Hub	C: 5	2	✓		200M	10M bit/sec Ethernet: 8; FDDI: 100		✓			NA	S1		✓			\$2,850-\$12,600/12
	RADring Modular Intelligent Hub	C: 21	2	✓		26M	10M bit/sec Ethernet: 80; token ring: 80		✓			NA	S1		✓		✓	\$1,300-\$6,900/12
	Web Ranger Hub	C: 21	2	✓		26M	10M bit/sec Ethernet: 80; token ring: 80		✓	✓		NA	S1		✓		✓	\$1,590-\$7,600/12

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Low-end hubs

Company	Product	Type	Backplane				Ports per unit	Other services			Management				Cost		
		C = Chassis: Max. no. of slots S = Stackable: No. in stack	Number	Shared bus	Switched	Speed (bit/sec)	LAN type: Max. number	Bridging	Routing	Terminal server	Managed units in stack	S1 = SNMPv1 S2 = SNMPv2	RMON	Bridge MIB	Repeater MIB	Router MIB	Price/ Warranty (months)
SVEC Computer Corp. (800) 756-7832	FD2500 Enterprise EtherHub family	S: 5	1	✓		10M	10M bit/sec Ethernet: 24				5	S1, S2			✓		\$725-\$1,595/60
	FD2600H BRouter Hub	S: 5	1	✓		10M	10M bit/sec Ethernet: 12	✓	✓		5			✓	✓	✓	\$2,650/60
	FD3000 Smart Concentrator	C: 12	2		✓	10M	10M bit/sec Ethernet: 264; token ring: 132	✓			NA	S1, S2		✓	✓		\$4,800-\$29,700/60
3Com Corp. (800) 638-3266	LinkBuilder FMS II	S: 8	1	✓		10M	10M bit/sec Ethernet: 24	✓			1	S1	✓	✓	✓		\$879-\$12,568/Lifetime
	LinkBuilder FMS100 Fast Ethernet Hub	S: 8	1	✓		100M	100M bit/sec Ethernet: 12				7	S1	✓		✓		\$2,899-\$9,575/12
	6-Slot and 17-Slot Online System Concentrator	C: 17	1	✓		542M	10M bit/sec Ethernet: 360; FDDI: 32; token ring: 148	✓	✓	✓	NA	S1	✓	✓	✓	✓	\$1,695-\$24,000/12
UB Networks, Inc. (800) 777-4525	GeoStax/E family	S: 5 or 10	1	✓		NA	10M bit/sec Ethernet: 16 or 24				5 or 10	S1			✓		\$1,150-\$1,995/ Limited lifetime
	GeoStax/FE	S: 5	1	✓		NA	100M bit/sec Ethernet: 12				1	S1	✓		✓		\$2,995-\$3,995/36
	GeoStax/T	S: 6	1	✓		NA	Token ring: 22				1	S1					\$2,895-\$3,295/ Limited lifetime
Whittaker Communications (800) 395-5267	Workgroup Ethernet Hub Model 1300	S: 4	1	✓		10M	10M bit/sec Ethernet: 24			✓	4	S1			✓		\$1,995-\$3,495/12

Product names highlighted in color were selected for the Short List.

Chart compiled by Kathy S.

Footnotes:

- (1) Shared backplane speed is 10M bit/sec; switched backplane speed is 80M bit/sec.
 (2) 12 months on power supply.
 (3) 10Base-T stackable modules have a limited lifetime warranty.

(4) Maximum of 255 in a stack.

(5) Maximum of 208 managed ports per stack.

NA = Not applicable

includes slots for plug-in modules, enabling you to swap out a malfunctioning port board with a new one, rather than tossing the whole unit away.

Meanwhile, in trying to stay one step ahead of the stackables nipping at their heels, major hub makers such as Cabletron Systems, Inc. and 3Com Corp. continue to improve the low-end of their chassis-based product lines by giving them the same type of LAN switching and ATM switch uplinks available on their high-end products and ever greater degrees of fault tolerance.

tral site — there is one key factor: You've got to plan for network migration. Devising such a plan will pay off in the long run by helping you identify the right opportunities, avoid unnecessary risk and choose a hub that has a clear upgrade path.

Along those same lines, hub capacity is another key consideration — whether in the number of slots in a chassis or the number of units in a stack — as is the variety of LANs supported.

You also need to understand how the number of shared backplanes and LAN interconnection options, such as filtering, bridging, routing, switching and WAN links, will position the hub to fit into your network migration strategy. Finally, port switching, support for the Simple Network Management Protocol and redundant power supplies round out what you'll need to look for in a low-end hub.

Capacity is a primary concern if your network continues to grow both in number of users and complexity. Hub capacity describes not only the sheer number of users, but also the breadth of technology supported, and it's important to consider both separately.

Ethernet is the capacity king when it comes to the sheer number of users you can squeeze into a single chassis or stack. Token ring, with source route bridging support, is not far behind.

Many low-end Ethernet hubs rely on a single repeater port for all users and therefore have an effective backplane bandwidth of only 10M bit/sec. This scales poorly

because the more users you put on an Ethernet segment, the more likely they are to experience packet collisions. So, look for hubs with an aggregate backplane bandwidth greater than 10M bit/sec, such as Network Peripherals, Inc.'s NuSwitch hub family.

The design of your network also may dictate the type of hub you should choose. Large, single-technology environments should look to high-capacity products, while users with application-specific

needs such as remote order entry or customer service workgroups might require lower capacity hubs with LAN or SN interconnection options.

Integrated bridging and routing, found on a variety of low-end hubs, while WAN connectivity is only beginning to find its way into the feature mix. Take a look at SVEC Computer Corp. or Cabletron as examples of vendors that provide WAN access ports.

While some chassis-based vendors

LAN switch modules

Product	LAN type	Speed (bit/sec)	Ports	Price
Allied Telesyn's 3600 Series Hubs	Ethernet	10M	16	\$12,320-\$17,320
	Ethernet	100M	2	\$6,995
	ATM	155M	1	\$10,700
Cabletron's MicroMMAC-E and MicroMMAC-T	Ethernet	10M	1	\$4,895-\$7,795
	Ethernet	100M	1	\$1,420-\$1,720
	FDDI	100M	1	\$1,995-\$7,485
	ATM	155M	1	\$3,290-\$8,390
Digital's MultiStack System	Ethernet/FDDI	100M/100M	6/1	\$4,095-\$7,995
Intellicom's OfficeStak 5000	Ethernet	10M	48	\$30,775
	Ethernet	100M	6	\$11,570
LANOptics' StackNetPro	Token ring	4M, 16M	8	\$12,000
Network Peripherals' NuSwitch Fast Ethernet Switching Hubs	Ethernet/Fast Ethernet	10M/100M	6-12/1-5	\$2,995-\$5,995
Network Peripherals' NuSwitch FDDI Switching Hubs	Ethernet/FDDI	10M/100M	6-12/1-6	\$4,995-\$9,595
Plexcom's PlexSwitch 5108 10Base-T Switching Hub	Ethernet	10M	8	\$3,250
	Ethernet	100M	1, 4	\$1,665-\$1,995
	FDDI	100M	1	\$2,995-\$3,495
RAD Data Communications' FDX-100 Modular FDDI Hub	Ethernet	10M	4	\$5,500
	FDDI	100M	2	\$1,750
3Com's 6-Slot and 17-Slot Online System Concentrator	Ethernet	10M	6	\$5,395
UB Networks' GeoStax family	Ethernet	10M	12	\$3,195-\$8,995
	Ethernet	100M	1	\$1,695
	ATM	155M	1	\$6,995
	FDDI	100M	1	\$3,995

There are more product details on Network World Fusion. Select NetRef then Buyer's Guides and click on low-end hubs to gain access to a list of the LAN interfaces supported by each vendor in the chart on page 70. The list tells you the type of LAN interface supported, the minimum and maximum number of ports for each LAN type and a price range.

Network World Fusion
<http://www.nwfusion.com>

This piling on of features comes as no surprise as all hub vendors start to feel the squeeze from LAN switches. In fact, the cost of basic 10M bit/sec Ethernet switching has dropped to nearly that of repeating, which is a hub's primary function. The upside of this price drop for hub vendors is they can now throw LAN switching into low-end products and keep those units affordable.

With all this happening, you need to take a systems approach to your low-end hub purchases and start to see the importance of network management and the movement from shared to switched LANs as part of an overall migration strategy.

Regardless of your immediate need — whether it be to connect 20 users in a single office or tie remote offices into a cen-

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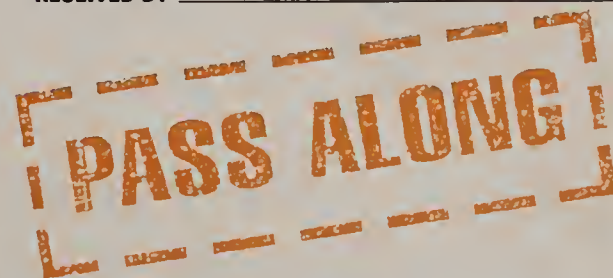
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such as 3Com can provide more than a dozen slots for option modules, stackable products often come in variations that provide similar, specialized functionality.

Digital Equipment Corp.'s DEChub 90 supports a wide array of technology for LAN and WAN connectivity. Digital is unique in that its self-contained DEChub 90 modules can be snapped into a chassis to create a hub that can be mounted just about anywhere, including high on a wall.

Migratory hubs

A hub's ability to support the inevitable network migration from shared to switched technologies is an extremely important purchasing factor. Features such as multiple shared backplanes or a

switching backplane and LAN interconnection options are found on fewer low-end hubs than we had hoped, considering the number of new products being introduced. But the number of low-end hubs that will support features is undoubtedly going to increase.

As the price of LAN switching continues to decrease, switched technologies will be more preferable than shared LANs. However, many environments may never require the 10M bit/sec bandwidth to the desktop that even simple, dedicated Ethernet switching gives today. If you plan to support low-bandwidth applications such as terminal-to-host communications or nongraphical environments, keeping users on isolated, or even bridged or routed, shared LANs will save you money with little sacrifice in performance.

If you need to provide lots of horsepower to users with bandwidth hungry applications, however, you'll want a hub that supports multiple LANs. And remember that the number of separate LANs supported by a hub normally corresponds to the number of shared backplanes.

As virtual LAN technology continues to develop, it's important that even low-end hubs have a way to create multiple LAN segments. The current thinking about VLAN implementation provides for one virtual network per shared segment. So it's easy to see that a low-end hub with a single backplane, and thus one LAN segment, only supports a single VLAN.

The multiple backplane feature has its genesis with high-end hubs and has survived downsizing by being implemented on low-end hub chassis. Several products with multiple backplanes warrant a look, including Plexcom, Inc.'s PlexNet CC8000 Multimedia LAN Concentrator, which has 14, and Lancastr's SuperHub 5000, which has six. Add a bridge/router module, and you can support a small workgroup backbone.

It's true that you can view these products as multiple hubs in one box. But without integrated bridging, routing or switching functionality, they rely on external products to perform LAN interconnection. Interested in a more comprehensive approach? Look to Cabletron or Intellicom, Inc. for integrated bridge/router support.

It's important to understand that multiple backplane implementations vary in how they connect users to LANs. In the simplest case, the hub dedicates a particular group of user ports to a particular seg-

ment. However, if your user base moves frequently, segment-switched hubs can incur net configuration constraints.

Further granulation enables a user on any port to be switched to any LAN segment without having to move the wire. 3Com's ONline System Concentrator, Digital's MultiStack System, Intellicom, Inc.'s OfficeStak 5000, LANart Corp.'s SegWay, and Network Peripherals' NuSwitch Fast Ethernet Switching Hubs and NuSwitch FDDI Switching Hubs all support this port switching feature.

When looking at migration strategies using low-end hubs, understand that only the smallest of isolated offices will not at some point require higher bandwidth via LAN segmentation, VLAN support through multiple backplanes or industry-standard LAN interconnection services.

High-end stackables are gaining ground on chassis-based products when it comes to having the features needed to help medium and even large workgroups make the transition from shared to switched LAN environments.

Management diagnosis

The bigger and more complex your network gets, the higher level of fault tolerance and network management you'll need. Support staff may come and go, taking with them their knowledge of your network's idiosyncrasies. So evaluate your

options carefully — and you may achieve lower overall cost of ownership when multiple technologies are integrated into a single, manageable and fault-tolerant platform.

In retrospect, most current low-end stackable users wish they had bought manageable products. No matter how much you rely on the organization-specific expertise your support team has learned about your configuration, one day it will not be sufficient to maintain an acceptable level of networking services.

You simply must have industry-standard network management tools in place to ensure that you can always recruit qualified and talented support people. At a minimum, you should rely on a combination of LED indicators and software-controlled network management to keep your machines humming.

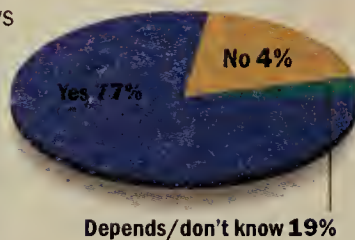
The Microsoft Corp. Windows-based applications supplied with many low-end hubs are often sufficient for networks of 20 users or less. For more horsepower, look for support of the industry-standard SNMP, which enables you to manage low-end hubs as part of an enterprise net via powerful Unix-based management platforms such as HP's OpenView, IBM's SystemView for AIX and Cabletron's Spectrum.

As SNMP and Remote Monitoring (RMON) agents become less expensive to

Reader views on low-end hubs

Based on 100 interviews

Are high-end stackables a viable alternative to low-end chassis-based hubs?



Yes

"High-end stackables give you the ability to introduce different features into networks without restructuring the whole network."

"High-end stackables are more dependable and can add bridging, other functionality and expand as you need."

"It's a cost issue. All the functionality is there in most high-end stackables for less money, except for port assignment to LANs. But even that is starting to be there."

"High-end stackable capabilities have come a long way in the past 24 months."

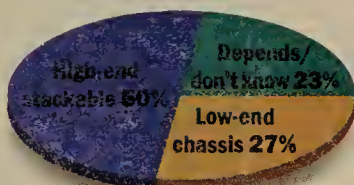
No

"You can't mix and match modules with high-end stackables as well as you can with low-end chassis."

Depends/don't know

"Low-end chassis hubs are better for small sites with 25 to 30 workstations because you get more intelligence and manageability. High-end stackables become attractive for anything under that number of users."

"You can actually get the same functionality from either type. Expandability can work both ways today."



Would you recommend using a high-end stackable or a low-end chassis hub to feed data to an enterprise-level internetworking device?

Hub type to use based on function

	WAN interface	Bridging/routing	Switching	Terminal server
Low-end chassis	12%	15%	19%	28%
High-end stackable	37%	32%	47%	21%
Either	45%	39%	20%	24%
Don't know	6%	14%	14%	27%

The survey was conducted by Focus Data, an independent market research firm in Framingham, Mass., that gathers primary data concerning the enterprise network environments and needs of end-users. To inquire about obtaining full survey results, send E-mail via the Internet to mdabbon@focusdata.ultranet.com or call Mona Dabbon at (508) 626-2556.

NetworkWorld Short LIST

Low-end hubs

The Short List highlights products Network World recommends you closely examine when purchasing low-end hubs. The selected products provide high aggregate bandwidth via multisegmentation, offer a robust interconnection method to form a distributed stack or have value-added management functions. These products can meet the needs of users with multivendor enterprise networks. Your needs may differ.

Digital Equipment Corp.'s DEChub 90 is among the products with the widest array of technologies in a low-end hub, as well as robust network management support. Its unconventional modular design supports hot-swappable modules. The DEChub 90 also provides for an upgrade path to the DEChub 900, Digital's high-end product. Modules snap into a rack- or wall-mountable chassis that provides interconnect services, making DEChub 90 one of the most flexible products in terms of fitting a unit with advanced features into a small space.

Integrated switching and routing, as well as multisegmentation, make Intellicom, Inc.'s OfficeStak 5000 very attractive for users needing to support a large installed base of legacy LAN technology. The 600M bit/sec aggregate backplane has five segments that allow you to isolate traffic and provide secure LANs. The architecture is a chassis/stackable hybrid with up to eight slots per unit, and up to three units per stack. Each unit in the stack can support a variety of modules. This product also supports WAN access.

By providing high aggregate backplane bandwidth and high port density, Plexcom, Inc.'s PlexStack family of hubs provide LAN segmentation through segment switching, which enables you to load-balance workgroups and provide flexibility in moves, adds and changes. Plexcom's management feature portfolio is bolstered by an intruder detection/prevention security scheme, virtual LAN configuration and port redundancy over 10Base-FL links without requiring a bridge module.

The sophisticated Flexplane backplane implemented over twisted-pair cable makes UB Networks, Inc.'s GeoStax family of stackable hubs attractive. With the Flexplane, GeoStax hubs can support as many as 15 segments per stack and five extended network domains. Value-added features cost about \$70 per port and include expansion capability, management and microsegmentation options. Management agents maintain statistics and diagnostics. This product line integrates well with mid-range GeoLAN/100 and superhub GeoLAN/500.

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implement and easier to integrate, software-based management tools will control more of the products in this market.

Management agents — whether SNMP, RMON or proprietary — are found on option cards in chassis-based hubs and even some stackables that come with expansion slots. Agents also can be embedded in the hub product. Hub stacks of 16 or more units often require

only one managed hub to monitor and control the entire stack.

By planning your stacks carefully, you can distribute management, ensuring you don't overspend on management agents. For instance, if you have two large workgroups, you purchase two managed hubs. Those managed hubs can then support less expensive unmanaged hubs in their respective stacks — a practice that makes good economic sense.

The dependability angle

Gone are the days when you had to sacrifice the reliability you received in inexpensive low-end chassis hubs to get the cost benefit of stackables. Today, a lot of low-end hubs — whether chassis-based or stackable — boast two important reliability features: port autopartitioning and redundant power supplies.

Experience has proven that the vast majority of network errors are the result

of physical problems such as bad cables or power supply failures. Low-end hubs that can react to, correct or indicate such network errors thus give you a leg up.

Autopartitioning automatically isolates a port with excessive errors while the rest of the hub functions until you can repair the problem. It can be compared to pruning a wildly growing bush — you lose a few branches until the bush grows in the direction you want.

Products with autopartitioning and/or redundant power are offered by many vendors, including 3Com, Bay Networks Inc. and Plexcom.

One vendor's stackable line is a bit antiquated in how the hubs are linked, especially in light of the recent focus on fault tolerance. HP's AdvanceStack Hub family uses 10Base-2 coaxial cabling to interconnect units. Given coax's propensity for errors, you may be better off with a proprietary method or one that uses a more stable wiring scheme such as UB Networks' GeoStax, which implements a proprietary Flexplane backplane across twisted-pair cable.

The best way to avert a power supply failure, which tends to be at the root of most hub crashes, is to provide power supply redundancy. And that is becoming more prevalent in products today.

Today, a lot of low-end hubs boast two important reliability features: port autopartitioning and redundant power supplies.

Fast into the future

As quick as the market is changing today, the pace at which new features are introduced is bound to pick up. Keep an eye peeled for the addition of Fast Ethernet support now that dual-speed 10M/100M bit/sec Ethernet network interface cards (NIC) shipments have surpassed those of 10M bit/sec-only NICs, according to our research.

Also, while Fast Ethernet products that have nonblocking switched backplanes are being developed, so are ones that employ shared LAN technology.

Network Peripherals, a veteran of another 100M bit/sec technology — FDDI — has turned its high-speed experience to Fast Ethernet by announcing a comprehensive product line of stackable shared and switched Fast Ethernet products with a starting price of just \$149 per port. Those products are scheduled to start shipping this month.

And as prices continue to drop while technology improves, your shared LAN options will likewise broaden.

So choose your low-end hub based on your technology requirements today, but be ready to revisit the market in about 18 months.

Ben-Yosef is president of Clear Thinking Research, Inc., a Boston-based market research and consulting firm. He can be reached via the Internet at ggb@world.std.com or by phone at (617) 536-8117.

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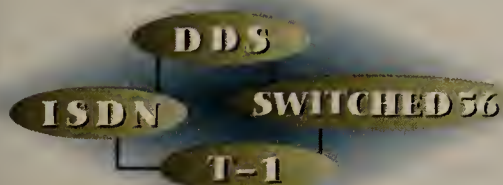
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Sizing up your broadband options

The Network World Broadband Ticker debuts, a quarterly look at the latest in high-speed services and how to make the most of them.

By Christine Heckart
and Beth Gage

New broadband service options are being announced so quickly it may seem impossible to keep up with all the alternatives, let alone determine which features may help optimize your network. This year has already brought major developments in frame relay, SMDS, ATM and other high-speed data services, including new access, pricing, network management and connectivity options.

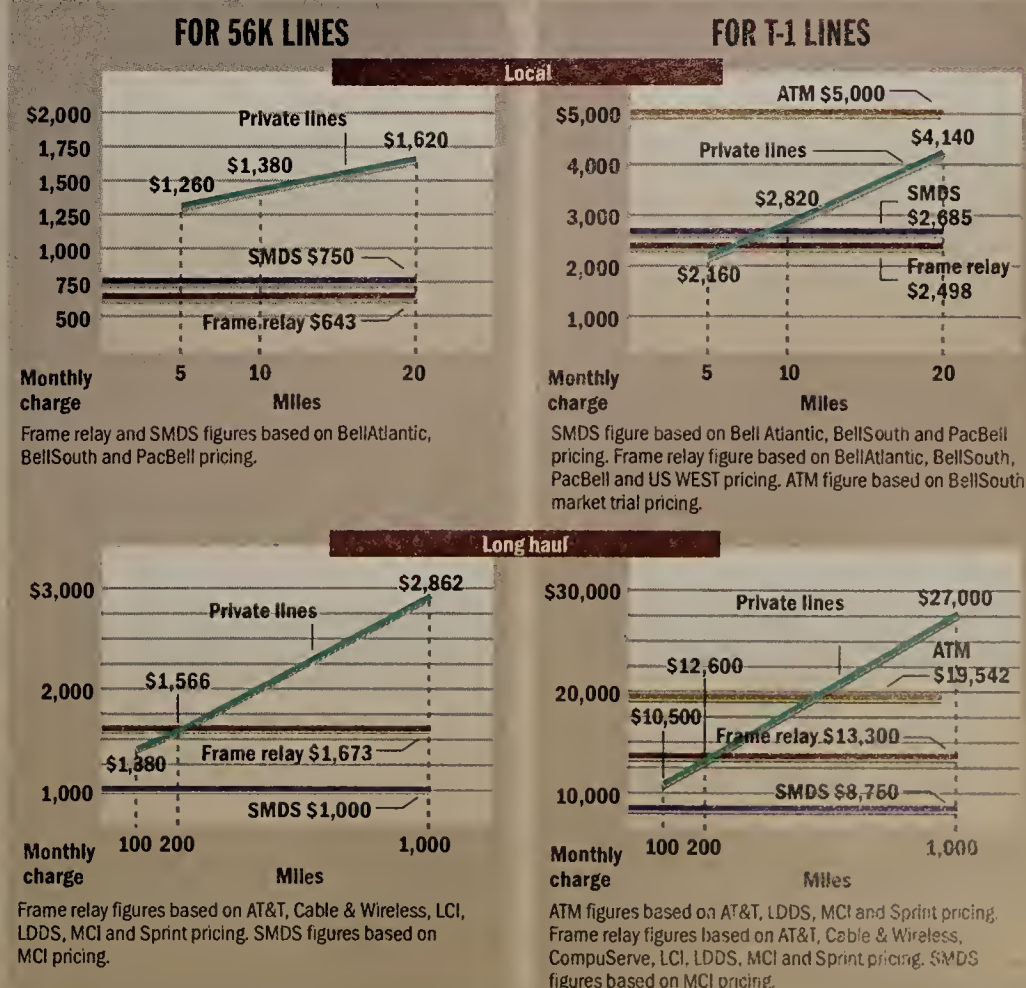
The *Network World* Broadband Ticker makes sense of the chaos. Every quarter, the Ticker will not only summarize all the new service features but put them in context of real-world voice, data, imaging and data communications requirements, helping you understand when it is appropriate to invest time and money implementing new features and when you're better off waiting.

In this first installment, we take a look at the flurry of recent announcements centering around frame relay. For example, LDDS WorldCom and MCI Communications Corp. now offer high-speed port connections, LCI International, Inc. lets customers use a network management terminal to change their committed information rates (CIR), and SNA-over-frame relay offerings have matured.

MCI, meanwhile, has turned its attention to Switched Multimega-

Service price comparisons

Industry average prices for theoretical network with 6 PVCs connecting 5 sites



bit Data Service, enhancing its HyperStream service with new addressing and billing features that are ideal for interenterprise communication and electronic commerce applications. There also have been a few new developments in the area of Asynchronous Transfer Mode, such as MFS Datanet, Inc. running voice traffic over a variable bit rate (VBR) connection to save bandwidth.

Frame relay forays

Without question, though, the hottest area has been frame relay. Providers have been working overtime to keep up with demand that is expected to bring the public frame relay services market to \$1.7 billion in the U.S. in 1997.

Remote LAN connectivity is still the most widely implemented application for frame relay, but many see SNA migration as the next big opportunity. Dial access alternatives are also hot, as they are an important feature for the growing small office/home office market.

A new way for SNA

At the tail end of last year, there was a flurry of frame relay announcements regarding SNA. Cable & Wireless, Inc. was one of the first with a prepackaged offering for SNA over frame relay, and Sprint Corp. now offers a managed frame relay access device (FRAD) service.

MCI early this year announced a family of SNA options for its HyperStream customers, including a native Synchronous Data Link Control interface into the frame relay network, with MCI providing the protocol conversion at each end. Intermedia Communications, Inc. pioneered this type of offering and has used it to migrate hundreds of SNA customers to frame relay.

CompuServe, Inc. also offers a comprehensive package for addressing SNA over its Frame-Net service. It is the only carrier to package Rumba software from Wall Data, Inc., which allows SNA shops to customize 3270 and 5250 screens into a more user-friendly graphical user interface (GUI) format while shedding remote controllers and moving to a LAN-based architecture. The Rumba package includes all necessary software and hardware, plus ongoing maintenance.

CompuServe provides a central-site gateway and remote-site software as part of the service. For clients keeping remote SNA controllers, CompuServe also offers Frame-Net customers the option of a packaged FRAD.

Pacific Bell will likewise be hitting the SNA scene this spring with a promotion for SNA over its Fastrak frame relay service that will provide the option of a FRAD and network management services.

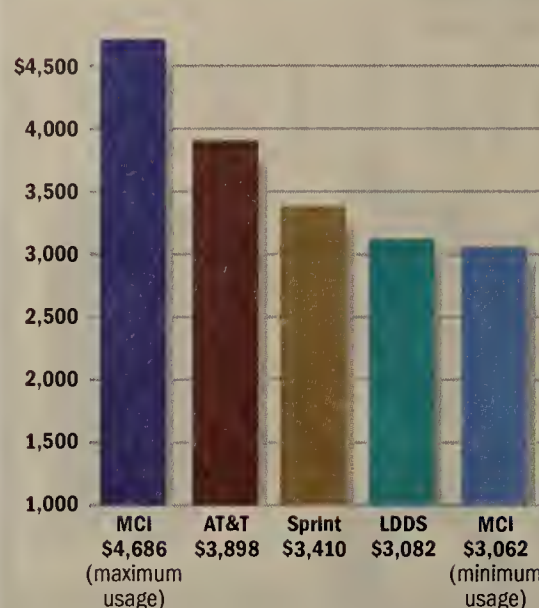
Access alternatives

The end of last year also saw the debut of several new frame relay access options.

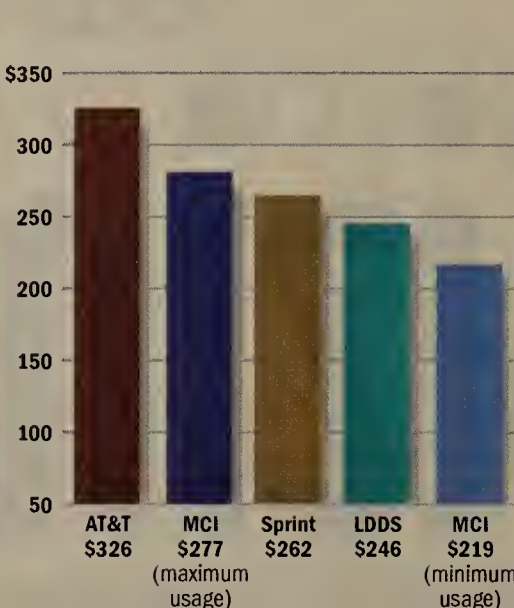
AT&T ended the year by announcing ISDN access using a Software Defined Network gateway, giving its SDN customers the ability to access the frame relay network without sacrificing all their usual

Frame relay pricing picture

Monthly charge for a 1.5M bit/sec port supporting 24 56K PVCs



Monthly charge for a 56K bit/sec port supporting a 56K PVC



Note: MCI's pricing is usage-sensitive. Prices shown reflect the minimum and maximum possible monthly charges as noted.

dial features, options and pricing plans.

AT&T joins Sprint and MCI in offering ISDN dial access into frame relay. Pacific Bell and Bell Atlantic Corp. have plans to add ISDN and/or analog access later this year, as does CompuServe.

For those needing more bandwidth, MCI and LDDS WorldCom have made frame relay available at speeds above 1.5M bit/sec, joining MFS in offering high-speed frame relay services. LDDS WorldCom is offering port connections at 3M, 4.5M, 6M, 10M and 19.8M bit/sec using inverse multiplexing technology, while MCI is offering a 3M bit/sec port on an individual case basis.

Bell Atlantic plans to offer high-speed access later this year, as does Pacific Bell.

At the other end of the spectrum, Cable & Wireless enhanced its analog dial access service and now supports 28.8K bit/sec access for both asynchronous and PPP connections.

Sprint, meanwhile is getting in on the Internet boom with Intranet, a new IP-based offering with security features that allow you to build private networks over the Internet. The service has a gateway into Sprint's frame relay network, making it an alternative for cost-effective access to headquarters from remote locations.

CompuServe has been offering a similar set of services since mid-1995 called Internet Link and Internet Link Plus.

Pricing, discounts and guarantees

For a while, it appeared that requiring frame relay services to be tariffed might be the biggest change in 1996 because it would prevent most users from negotiating custom arrangements.

But a Federal Communications Commission ruling that all interexchange service tariffs be dropped has thrown that issue into question (NW, March 25, page 1).

Before that ruling, carriers including AT&T and MCI came out with new service and delivery guarantees, but LCI is offering the industry's only formal program for cross-product discounting. Its Simply Guaranteed and Integrity programs provide discounts ranging from 2% to 20% on all purchased services based on the

combined revenues from voice, private line and frame relay. Pacific Bell plans to follow with a cross-product discount option later this year.

New features and options

LCI has a new service that enables its FramePlus customers to modify the CIR of a permanent virtual circuit (PVC) in real time via a network management terminal. The service, called Authority, also provides a GUI for point-and-click access to network performance information, alarms and detailed network routing configurations.

US WEST, Inc.'s Interprise Networking Services unit has the industry's first frame relay multicast service, which is ideal for applications that broadcast information to a large group of users on a regular basis. Pacific Bell plans to make multicasting available later this year.

For disaster recovery, AT&T, MCI and LDDS WorldCom have made available packages in which the disaster port connections and/or PVCs are provided at a lower rate than standard frame relay service. CompuServe plans a disaster recovery package by the third quarter.

MCI leads SMDS charge

Several new developments in SMDS in the last few months — most spearheaded by MCI — bring new pricing, access options and other features.

Access alternatives

MCI has two new SMDS access innovations that also bring new billing options. The carrier now offers toll-free 800 access, where the receiving party is billed for the SMDS usage. The service is ideal for users such as large broadcast companies which store radio and video clips on centralized servers so nationwide television affiliates can easily download the information.

MCI also has a new value-added address access option that makes the SMDS service similar to a 900 call, where the caller pays for all associated transactions. This is designed for such companies as information providers and Internet

access providers, and could be used for providing access to corporate Web sites in some instances.

To address connectivity needs between 1.5M and 45M bit/sec, MCI's HyperStream SMDS now sports a new NxDS-1 DXI access option. BellSouth Corp. plans to offer 3M, 6M and 45M bit/sec access later this year, while Bell Atlantic is planning ISDN access into its SMDS service. Ameritech already offers dial access as well as ISDN Basic Rate Interface and Primary Rate Interface. With announcements in the last six months by Pacific Bell and Bell Atlantic, nearly all of the service providers offer low-speed SMDS access at 56K bit/sec.

Pricing, discounts and guarantees

All of the regional Bell operating companies have long offered flat-rate SMDS pricing with unlimited usage. MCI, on the other hand, has a usage-based pricing scheme, although it recently simplified the plan using postalized rates, in place of its former distance-sensitive pricing. Users are charged a flat rate per port connection based on the port speed, and a flat fee per megabyte of data delivered. In addition, users of the SMDS-based exchange access (XA) interface pay a per-megabyte surcharge that is not imposed on customers with data exchange interface (DXI) access.

SMDS pricing is no longer an issue for US WEST, which has decided it will no longer offer the service in any state, except to its two existing customers. Most US WEST customers requiring a connectionless service have opted for the company's aggressively priced Transparent LAN Service instead of SMDS.

Glossary of terms

ABR

Available bit rate; an ATM class of service for data applications.

CBR

Constant bit rate; an ATM class of service for synchronous applications.

CIR

Committed information rate; the assigned bandwidth of a PVC.

DXI

Data exchange interface; dedicated access into an SMDS service.

UBR

Unspecified bit rate; an ATM class of service for data applications.

VBR

Variable bit rate; an ATM class of service for voice, video or data applications.

XA

Exchange access; using local SMDS-based link to access an interexchange SMDS network.

New features and options

National connectivity. MCI and BellSouth are interconnecting in Atlanta and Miami, bringing MCI's level of nationwide interconnection to more than half of all local access and transport areas.

Packaged options. Pacific Bell is offering Fastrak Imaging Solutions to the press industry that packages equipment, software and SMDS service.

ATM coming of age

ATM services have continued to mature over the past six months, and pricing is starting to solidify. Important standardization work is being done in legacy LAN support, switch interconnection and video over ATM. Exciting new work in voice over ATM has also been completed, though more is on the way.

And more carriers are getting into the game. CompuServe, for example, now has ATM available on a limited basis from speeds of 1.5M to 45M bit/sec. Cable & Wireless is conducting trials with three ATM customers with a service targeted for rollout in the second half of this year.

Access alternatives

Several providers now offer ATM services at speeds in excess of 45M bit/sec. Sprint is offering a 140M bit/sec port connection, while Interprise and Bell Atlantic support speeds up to 155M bit/sec, as does Pacific Bell with its ATM market trial. Most of the carriers also now offer ATM at speeds as low as 1.5M bit/sec for smaller locations.

Pricing, discounts and guarantees

Carriers are still treating ATM service pricing as confidential, proof that the service is still in the early stages of market availability. So, while getting pricing from your carrier may be difficult, it is available.

If you need high-speed ATM, MCI's 45M bit/sec pricing is the most aggressive of the interexchange carriers, with port and PVC prices as much as 50% less than competition.

Sprint's new usage option provides another alternative for keeping costs in check. On the local front, US WEST offers the best ATM prices.

New features and options

Voice. Voice over ATM can be carried by constant bit rate (CBR) or VBR connection. There are bandwidth efficiencies to

be had using VBR, although a higher quality of service can be guaranteed with CBR. MFS became the first carrier to offer a VBR-based voice-over-ATM service called WAVE, for Wide Area Voice Exchange. Teleport Communications Group (TCG) offers integrated CBR voice services allowing voice, video and data to be supported over a single ATM service link.

■ **Native LAN interconnection.** A few local carriers are offering ATM-based

native LAN interconnection services. MFS has long been doing this, using an ATM edge switch from NetEdge Systems, Inc. US WEST, TCG and Cincinnati Bell Telephone also now offer these services at highly aggressive monthly rates.

■ **Multicast.** Although not officially a service yet, MFS has recently begun supporting an ATM video application for Dow Jones to distribute information to its customers and users on demand. The appli-

cation is the first of its kind to make use of ATM multicasting, pioneering developments that should spur additional service providers to offer this feature.

Heckart is director of broadband consulting and Gage is a broadband consultant for TeleChoice, Inc., a telecommunications firm in Verona, N.J. They can be reached by phone at (918) 343-0201 or via the Internet at christine_heckart@telechoice.com.

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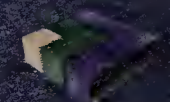
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Get back to basics on frame relay, ATM and SMDS via Network World Fusion.

You'll find links to:

- The Frame Relay Forum site, which includes white papers on frame relay topics such as SVCs and a comparison to ATM, plus case studies and a glossary of terms.
- The ATM Forum site, where you'll find a primer and a survey where you can give input on your own ATM requirements.
- An SMDS explainer from the SMDS Interest Group.

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Placing your broadband bets

By Christine Heckart and Beth Gage

The key to investigating new technologies is making sure your time is not wasted chasing after the wild goose, which amounts to being able to determine when a particular feature is truly beneficial.

Consider SNA over frame relay. The onslaught of new services in this area may lead you to believe that there has been a recent leap forward in technical developments.

It isn't so.

There are still two main ways to handle SNA over frame relay: encapsulating it into IP or directly translating it into frame relay per the specifications set forth in RFC 1490.

What's new is the willingness of carriers to support the equipment required to transport SNA over frame relay and to assist customers with network implementation. Most carriers still lack extensive

experience in SNA networking, but they are working to increase the expertise of network operation center personnel so they can better assist with implementation, trouble isolation and resolution.

If you have a mix of SNA and LAN traffic, you should investigate using frame relay, as the savings could more than make up for the time invested. Begin by working with router and frame relay access device (FRAD) vendors to understand the capabilities and limitations of the available options.

Among the well-documented benefits you'll find is that multiport connections are configured logically, not physically, and can be easily modified as traffic conditions change. There are also equipment cost savings because the number of WAN ports is reduced and you may be able to eliminate some remote front-end processors. If separate LAN and SNA networks

are consolidated, then big reductions in monthly recurring costs can be achieved.

However, the risks include a lower level or different type of end-to-end network management and control, and maybe an initial investment in new equipment, such as FRADs or routers. It is also possible that certain network parameters, such as session time-out thresholds, may have to be adjusted.

If you want to get around making new investments in FRAD equipment, you can choose a carrier that will perform the conversion from SNA to frame relay. The biggest risk is that you are giving up control over this equipment and function to the service provider; for some companies, this may not be acceptable, especially if the applications are mission-critical.

Still, if you are trying to decrease costs, increase network flexibility, reduce response times or simplify the network architecture, then you should explore SNA over frame relay. The most important thing is to test the solution thoroughly for several months in a trial configuration between a few locations to get the bugs worked out before migrating the entire network.

Dial access options

Dial access into a broadband service is ideal for locations with relatively low traffic volumes supporting applications that are not time-sensitive and probably not mission-critical. Consider using analog dial access for mobile workers with portable laptops, home-office applications and net recovery, especially when applications are relatively delay tolerant and the files being transferred are not too large.

Digital dial access options are appropriate for small remote offices and network recovery applications, especially where bandwidth-intensive applications are being used, such as desktop data conferencing or videoconferencing, remote client/server and large file transfers.

High-speed alternatives

Recent announcements of high-speed frame relay as well as low-speed Switched Multimegabit Data Service and ATM blur the lines between these services and increase the confusion about when each is most appropriate.

But speed is not the most important criterion for choosing a broadband service; instead, you should be thinking instead about the applications you need to support and the characteristics of the user group needing connectivity.

If you support mostly data applications in a closed user group environment, where each remote location needs connectivity with a few other locations, then frame relay is probably the most appropriate service. High-speed frame relay options provide a solution for central-site access when a high volume of traffic is aggregated in a single place or for applications that need very high-speed connectivity, such as off-hour data backup.

Network World Broadband Ticker roundup

What's new	Who's announcing	Who's been there
Frame relay		
SNA Service	MCI	Cable & Wireless, Sprint, CompuServe
ISDN dial access	AT&T	MCI, Sprint
IP gateway	Sprint	
Analog dial access	Cable & Wireless	AT&T, MCI, Sprint
High-speed ports	MCI, LDDS WorldCom	MFS Datanet
Pricing changes	LDDS WorldCom, AT&T	
Service guarantees	AT&T, MCI	Sprint
Multicast	US WEST	
Disaster recovery		AT&T, MCI, LDDS WorldCom, Sprint
Service/CPE packages		AT&T, MCI, Sprint, PacBell, Bell Atlantic, MFS Datanet, CompuServe
SMDS		
NxDS1 access	MCI	BellSouth
ISDN access		Ameritech
Analog access		Ameritech
Billing upgrades	MCI	
National Connectivity	MCI and BellSouth	
ATM		
Voice over VBR	MFS Datanet	
T-1 ATM	CompuServe	AT&T, MCI, Sprint, LDDS WorldCom
Fractional T-3 ATM	CompuServe	LDDS WorldCom, Sprint, MFS Datanet
T-3 ATM	CompuServe	AT&T, MCI, LDDS WorldCom, Sprint, US WEST, MFS Datanet
OC-3 ATM		MCI, Sprint, US WEST
Frame relay service interworking		AT&T, Sprint
Usage-based pricing		Sprint
ABR class of service	CompuServe	LDDS WorldCom
CBR class of service		AT&T, Sprint, MCI, LDDS WorldCom, US WEST
UBR class of service		MCI
VBR class of service		AT&T, MCI, LDDS WorldCom, Sprint, US WEST, MFS Datanet
ATM market trials		BellSouth, PacBell

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communications between locations and support for a number of different applications simultaneously. But you may find the promise that ATM will do all this and save money too is not yet being fulfilled, as ATM pricing continues to be prohibitive for many users. The best advice for most with regard to long-distance ATM is to sit tight and wait for the service pricing to decrease, although if you need very high-speed connectivity today, you may be able

to cost-justify MCI's T-3 ATM rates.

If you need local ATM or native LAN services, you should definitely check into the options available in your area.

Voice over ATM

Voice over ATM should be considered mainly to support an integrated access solution, not to save money on voice services. It is hard to beat traditional telephony pricing for straight voice

applications, on-net or off.

On the other hand, if you already need or have ATM for data applications, the addition of on-net voice traffic can be cost-effective. Keep in mind that constant bit rate (CBR) connections are treated by the net as dedicated bandwidth and the idle capacity cannot be dynamically allocated to active applications. But quality will be high and consistent. VBR connections are less expensive, but fewer equipment vendors support it. Most interfaces between ATM switches and private branch exchanges are designed for CBR connections at this time.

Network management

Regardless of the size or sophistication of your network, it's a good idea to get periodic network utilization and performance reports, whether from your carrier or generated in-house. These reports let you know if you are spending too much and leaving network capacity idle, or if you are reaching a point of network utilization that might require you to increase your spending in the near future.

If performance is critical and your network is growing or changing rapidly, you should probably be taking advantage of the on-line Simple Network Management Protocol statistics and performance reporting features available with broadband services. Be advised that prices for these on-line management services vary widely; some carriers offer them free of charge, while others charge as much as \$250 per month.

If your network is less dynamic or an on-line system is not affordable or practical, ask for quarterly hard-copy utilization reports and monthly alarm reports. This gives you the information you need in a user-friendly format.

CPE solutions

Consider buying a complete package including equipment and transmission services from a carrier if ease of administration and operation are major decision criteria. You can save a few dollars by negotiating separately with the carrier and equipment vendor, but any savings may be lost in the added cost of managing multiple vendors.

If your network is global in scope, such package deals are even better for reducing operations and management costs. Unless you already have knowledgeable networking people in international locations and established relationships with equipment vendors for support and on-site maintenance, you should definitely consider this option. It will save money and frustration.

The telecommunications industry is so hype-oriented that it is easy to lose sight of reality at times. Some new capabilities require a high investment in time and money on the part of early users that you must take into account, even though there may be an adequate long-term return on this investment. Other new features have a much lower level of initial risk and investment and can provide savings or benefits almost immediately. Our Broadband Ticker will help you evaluate these benefits and risks each quarter. ■

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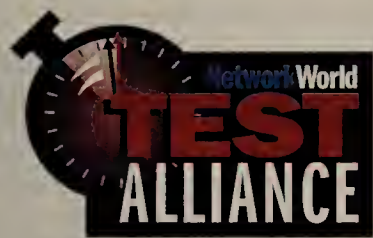
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Server safety net

These two NLMs provide a measure of fault tolerance for NetWare environments

By Howard Marks

When servers go down, users rise up and rebel. To avoid the specter of angry users gathering outside their cubicles, preparing to flog them with coaxial cable, network administrators turn to redundant components, RAID storage and server-based software to promote server uptime.

This week, we look at two software solutions for NetWare servers. Network Integrity's LANtegrity doesn't just copy data that's currently on a server to a backup server; it also incorporates a tape backup module. LANtegrity protects server data on a file-by-file basis, copying changed files from the protected server to the backup periodically. Network Specialists, Inc.'s Double-Take is a NetWare Loadable Module (NLM) that duplicates file write operations to a backup server.

LANtegrity is better suited to an office automation environment where high-availability and efficient automatic backups are important, while Double-Take — because it ships only changed information across the network — is a better solution for environments where most write operations are changes to records in large files. Mixed environments may prefer LANtegrity because of its bundled tape backup features.

Both of these products, along with similar ones we looked at last year (NW, July 3, 1995, page 31), fall short of true fault tolerance in that they don't shield users from hardware or system failures. Instead, they concentrate on eliminating data loss as a result of the failure and on reducing downtime by eliminating the hours needed to rebuild a failed server and restore its data from tape.

LANtegrity and Double-Take do, however, allow a backup server to protect the data on multiple servers at the same time. LANtegrity provides an automatic recovery if one server fails. Double-Take is a simpler continuous backup system that has no automatic recovery mechanism.

Network Integrity's LANtegrity

A single LANtegrity server can hold copies of the data from multiple protected servers and, in the event that one of the protected servers goes down, take over for any one of them. Unique among the four products we've looked at — including the two in the last review — LANtegrity not only provides many-to-one high-availability protection but also serves as an off-line backup program, automatically copying protected files to tape.

LANtegrity comprises three major components: the LSSERVER NLM, which runs on the LANtegrity server; the LSAGENT NLM, which runs on the protected servers; and the Windows-based LANtegrity console.

When LANtegrity is running, the agent program in each protected

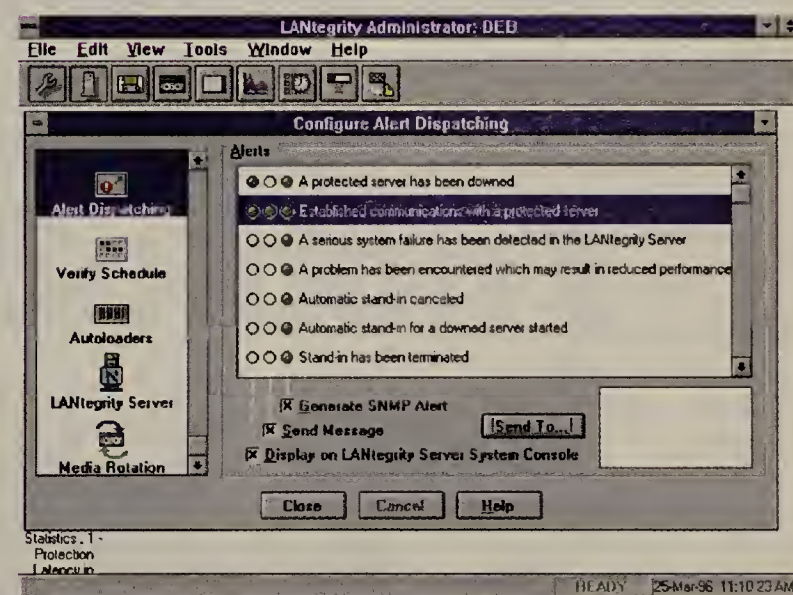


Figure 1: LANtegrity has multiple ways of sending problem notifications.

NetResults

Product	LANtegrity	Double-Take
Vendor	Network Integrity, Inc. (508) 460-6670	Network Specialists, Inc. (201) 804-8400
Method of operation	► Periodic backup to other server via NLM	► Server-based file system write duplication
Pros	<ul style="list-style-type: none"> ▲ Also provides off-line backup and some HSM features ▲ Allows multiple servers to be protected by one backup server 	<ul style="list-style-type: none"> ▲ Real-time data duplication ▲ Less network traffic generated ▲ Allows multiple servers to be protected by one backup server
Cons	<ul style="list-style-type: none"> ▼ Not real time ▼ Copies whole files, creating much LAN traffic ▼ Limited hardware support 	<ul style="list-style-type: none"> ▼ Can protect only NetWare 3.X servers ▼ Generates some network traffic ▼ No automatic recovery process
Price	\$4,950 for 100 users aggregate on protected servers; additional user prices available	\$31,875 for 100 users aggregate on protected servers; prices available for greater or fewer users

server periodically (by default, every 15 minutes) looks for files whose archive bit has been set by any program. If it finds such files, it copies them to the LANtegrity server using NetWare Storage Management System target service agents' remote procedure calls (RPC), then clears the archive bit. Optionally, for those sites where another program may clear the archive bit, you can have the LANtegrity agent back up those files whose last archive date and time is after the time of the last cycle.

LANtegrity always copies the entire changed file and not just the changes. Because this process takes place across your network and not over a dedicated communications link between servers, a significant amount of LAN traffic can be generated if you have a large number of users or if your users work with large binary files.

For the text of our previous review of fault tolerance software, go to Network World Fusion (<http://www.nwfusion.com>). Select NetRef, Buyer's Guides and Reviews, then Fault-Tolerant Server Software.

<http://www.nwfusion.com>

When files are copied to the LANtegrity server, they are stored in LANtegrity's Intelligent Data Vault. The vault consists of the disk storage on the LANtegrity server, the tapes that are on-line in the server's autoloader and off-line backup tapes. The most active and most recently changed files are kept on the server's disk. File deletions, the NetWare bindery and NetWare Directory Services database and other less active data is backed up to the LANtegrity server each night. Older files are copied to the tapes in the auto-changer.

Each changed file is copied to two tapes in the autoloader. The first tape is used to recover files when the LANtegrity server is standing in for a failed server. The second is used for traditional backups. LANtegrity automatically manages tape rotations, keeps track of how many times a tape is used and even automatically runs a cleaning tape if your auto-changer requires it. Once you install LANtegrity, you'll no longer need a separate backup program such as ARCserve or Backup Exec.

The LANtegrity server and its protected servers are in constant communication. Should the LANtegrity server not be able to communicate with the protected server, it will stand in for it, advertising itself using the down server's name and allowing users to log in. Of course, should users try to access data that's archived off to tape, there may be a delay as that data is recovered.

When the failed server is restored to health, it reboots with an alternate server name. The LANtegrity server synchronizes its data to allow the failed server to come back up with all the changes that occurred to its data while it was down. When the resyncing process is complete, LANtegrity can automatically reboot the

failed server under its original name and go back to protecting that server's data.

Unlike the other systems we've looked at, LANtegrity can continue to protect the other servers on your net even when standing in for a failed server.

If a protected server goes down or some other event requiring the administrator's attention should occur, LANtegrity can send an alert via the NetWare real-time messaging facility by posting a message on the LANtegrity server's console or by sending a Simple Network Management Protocol alert (see Figure 1, page 85).

But providing all these services requires extra resources. The LANtegrity server must have 16M bytes more memory and at least 1G byte more disk space than the largest protected server. It must also be equipped with a SCSI host adapter and tape autoloader that are compatible with Novell, Inc.'s NetWare Peripheral Architecture, which is not yet widely supported by hardware manufacturers.

In fact, Network Integrity lists support for only four autoloaders—two for digital audio tapes and two for the faster and higher density digital linear tapes—and only one host adapter, from Adaptec, Inc. If you want to use some other device, you'll have to pressure the vendor into creating the appropriate drivers.

We had a bit of difficulty installing the LANtegrity console on a Windows for Workgroups (WFW) system that also had Microsoft networking enabled. LANtegrity insists on seeing Novell's NETWARE.DRV as the first network driver on the station in order to establish an RPC connection to the LANtegrity server. When the Microsoft Corp. network driver is loaded ahead of the NetWare driver, the LANtegrity console cannot communicate with the server. We solved the problem by

HOW WE DID IT

We tested both products using as our primary server a Magitronics, Inc. 486/33 file server with 20M bytes of memory. A Micronics Computers, Inc. 486/66 EISA server with 48M bytes of memory running NetWare 4.1 was our secondary server running the backup software. We used an Adaptec, Inc. 1542 SCSI host adapter to control a Quantum Corp. DLT 2500 autoloader.

When testing LANtegrity, we ran NetWare 4.1 on our primary server. For Double-Take, we installed NetWare 3.12.

We placed 200M bytes of data on the primary server, waited for the primary and secondary servers to sync, then modified several 2M- to 5M-byte files. We used Microsoft Powerpoint, a presentation graphics application that's part of MS Office, to change complete files and Microsoft Access for a record-by-record update. For LANtegrity, we also caused a primary server to fail and noted how the LANtegrity server stood in.

disabling WFW's Microsoft networking.

Once that problem was overcome, LANtegrity worked flawlessly, protecting our primary server and recovering with aplomb.

One potential problem we discovered is that if the data link between the primary and standby server is lost, the standby will stand in for the primary as it would if the primary server went down. When the link comes back up, which may be just a matter of minutes as a new route is established, the primary server will be forced down to resync, kicking its users off.

All in all, however, LANtegrity provides a good solution to the parallel problems of backup and high availability. With time for performing administration tasks always at a premium, combining these two functions is a good idea. If you can deal with the limited hardware support, live with losing file changes over the 15 minutes or so it takes to run a cycle, and if your network can handle the additional traffic LANtegrity generates, it's a good solution.

Network Specialists' Double-Take

Network Specialist's Double-Take takes a novel and quite useful approach to providing real-time backup by duplicating file system write requests to a target server. Unlike LANtegrity, it doesn't really address the high-availability problem, as there is no automatic recovery should the source server fail.

Each time a user workstation or NLM makes a request to write to a file or the NetWare bindery, the DBLGIVE and BINDGIVE NLMs duplicate that request and send it over the network to a standby server running the DBLTAKE and BINDTAKE NLMs. The administrator can configure the system to provide protection for the entire server or only for those directories that contain especially valuable data (see Figure 2).

This approach has several advantages over most of the alternatives. The most significant is that it can provide both real-time data protection and a many-to-one relationship between protected and standby servers.

Another advantage is a significant reduction in network traffic in environments that have large files that are updated by frequent transactions. With Double-Take, only what's changed gets sent over the network. A user making a small update to a multimegabyte database generates only a little network traffic with Double-Take, where the same user would cause the whole multimegabyte file to be copied across the network when using a file replication system such as LANtegrity or Horizons Technology, Inc.'s LANshadow.

Unlike disk-mirroring products, Double-Take doesn't require special hardware or a one-to-one relationship between protected and protecting servers. And unlike tape-based continuous

backup systems, Double-Take's server disk backups allow users to log in to the backup server and an administrator to more quickly restore files.

Network Specialists has addressed one potential problem with the transactional approach by managing network bandwidth.

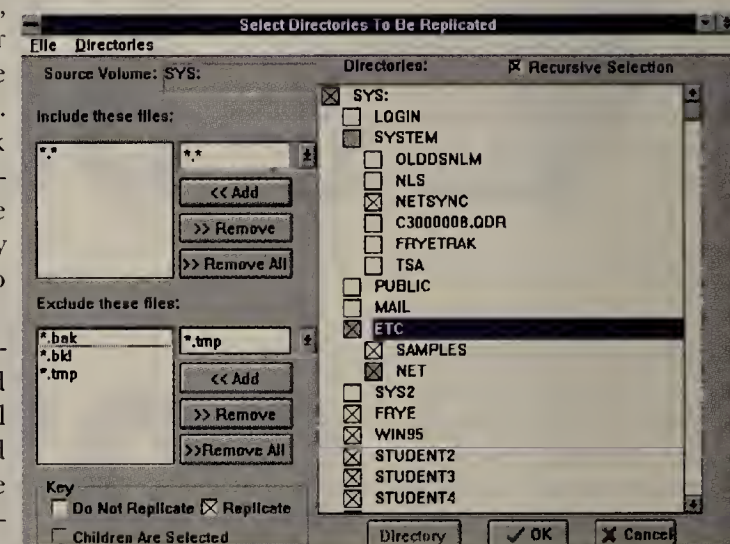


Figure 2: Double-Take allows you to choose specific files and directories to protect.

width. Double-Take queues requests for the standby server in a compressed form if the link between the primary and standby servers is clogged or unavailable. When link bandwidth is once again available, the queued requests are processed. This compression and queuing means that Double-Take can be used over WAN links for off-site backups.

Double-Take is a simple product. We had it installed and running in a matter of minutes. We found its Windows-based administration console equally clear and easy.

On the downside, the current version of Double-Take can only protect NetWare 3.X file servers. The standby server can run NetWare 3.X or 4.X.

Two approaches to take

These two products take rather different approaches to the data protection problem.

LANtegrity provides an elegant integrated file backup and file server recovery system. Its major drawback is the fact that copying whole files across the network can create a large time delay and a lot of network traffic. Double-Take avoids this pitfall by making transactional copies between the servers, but it needs an automatic recovery process to be truly competitive in today's market. ■

The alliance is a cooperative of users, consultants, educators and integrators that applies its technical and business skills to analyze and compare strategic network products. A list of alliance partners can be found on page 65.



Marks is chief scientist at Tiger Team, Inc., a South Norwalk, Conn.-based consulting firm specializing in Windows 95 and Windows NT network integration. He also serves as a principal of Are Our Lives, Inc., a network consulting firm based in Dutchess County, N.Y. He can be reached at hmarks@pipeline.com.

Message queue

Continued from page 65

accurate information from the vast sources available. The column was so inaccurate, it was laughable.

I have been in the profession for 20 years. The misinformation peddled the last few years has been increasing geometrically... from both IBM and Microsoft dynamics. I have been reading *Network World* for a long time. After this, it goes in the trash along with my other junk mail.

Harry Laudmeier
Wayne, Ind.

Kearns responds: The column in question was not a review of OS/2 Warp Server (which I feel is a decent product), but a review of the IBM announcement letter for OS/2 Warp Server. The point was that IBM still does not know how to sell the PC and LAN marketplace.

We can all agree that OS/2 Warp Server is a better product than NT Server 3.51 — it remains to be seen what NT Server 4.0 will do to that equation. We can also agree that OS/2 is a better desktop operating system than Windows 95, but it's the same as saying that CP/M was better than DOS — without proper marketing, having a better product is simply not enough.

OS/2 Warp Server is no more the "perfect balance" of application server/file and print server than either NT Server or NetWare. All three offer application services. All three offer file and print services. All three can quote endorsements and benchmark numbers suggesting their superiority.

OS/2 Warp Server, NT Server and NetWare all have a place in a diverse enterprise. Each has at least one thing better than the other two. I hope to continue pointing out the best (and worst) qualities of each.

On Netscape and Banyan

In his column "A story of Bob, Banyan and the conquest of the Internet" (Feb. 26, page 58), Mark Gibbs asked readers who use Netscape Communications Corp.'s Navigator whether they bought their copy. Here are some of the responses he received, as well as reader feedback on his comments about Banyan Systems, Inc.:

I didn't purchase my copy of Netscape Navigator. I did purchase Quarterdeck Corp.'s Quarterdeck Mosaic, but I was unable to get it to function on my machine.

Mr. Nelson
Little

I didn't pay for Netscape Navigator, but I use it every day at the university where I work. I never use it at home.

Phil Wheeler
Charlottesville, Va.

I use Netscape's browser. I bought the personal edition. I am kind of confused, though; there was no registration card in the package. I did not make too much of an effort to plow through the Netscape home page to see if I could register it electronically.

Jim Rubin
Hudson, Conn.

I haven't bought Netscape Navigator yet. I'm presently using the beta version. I will be purchasing it for my company and myself in the very near future.

Per Gibbs's suggestion, I checked out Coordinate.com's Switchboard (<http://www.switchboard.com>). It's not bad, but the phone CD-ROMs give better search capabilities.

Ray Ward
Newbury Park, Calif.

We bought a license to use Netscape Navigator for our small office of some 20 PCs. I don't know a lot of folks who have purchased the product.

Gibbs says he has "yet to see anyone demonstrate real scalability of a naming service across hundreds of servers." My organization has 378 VINES servers in locations around the world, all connected, all communicating and reporting via Banyan's StreetTalk. It works fine and

allows sharing of resources — anywhere, anytime. Not too shabby when compared with anything that Novell or Microsoft offers, is it?

Of course, Banyan has a few problems, lack of intelligent marketing being one of them. Perhaps the company will get its act together, perhaps not.

If Microsoft was as smart as everyone seems to think, it would buy Banyan in a heartbeat.
See Message queue, page 88



The only trick they know is 24 pages per minute. So don't expect any real intelligence.



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Message queue

Continued from page 87

heartbeat—just to get StreetTalk.

Rich Kissel
Silver Spring, Md.

I would like to comment on Banyan reinventing itself.

My organization has been running a Banyan VINES network for the past five

years. The net consists of 285 workstations and one server. It will soon be expanding to a little more than 500 workstations.

I researched several operating systems that would handle that type of growth and have very little impact on my users after the switchover. Windows NT required too many servers to support 500 workstations and Novell NetWare 3.5 wouldn't interconnect with the rest of the campus very well, which left Banyan's Enterprise Net-

work Services (ENS). ENS looked like the perfect solution; the change to ENS would have very little impact on my users and could easily support the number of required workstations.

I purchased a copy of ENS for AIX and an RS/6000 Model R30 after consulting with IBM and Aquila Technologies Group, Inc. (our Banyan VIP reseller) about the compatibility of the two products. When both had arrived, I tried to

install the ENS software on the RS/6000. The install failed. I called Aquila's technical support and queried them about why the install failed. Three months and several dozen telephone calls later, Aquila let me know that Banyan isn't supporting the version of AIX that my RS/6000 requires.

When I asked when Banyan would be updating ENS to support the latest AIX version, I was told sometime in 1997. I asked what was the reason for the long delay in the update and was told that Banyan had pulled 85% of its R&D people off their current projects to port ENS to Windows NT and to work on porting StreetTalk to the Internet.

In my opinion, Banyan has forsaken its current customers and products to bring this new product to market. I'll be the first to admit that a company needs to develop new products to survive in the marketplace, but leaving your current customers hanging high and dry is not going to advance your business, either.

Based on the problems I've had with Banyan over the last six months, I recommended moving to an IBM AIX Connections and Microsoft Windows For Workgroup environment to meet our networking needs.

So far, this move seems to be the right one. AIX Connections is working out well, and the impact on my users has been minimal. I get the occasional complaint about StreetTalk no longer being available, but everyone seems to be adapting.

Brian Gilbert

Fort Collins, Colo.

Factionalism hurts

I agree with the sentiment expressed in your editorial "Gigabit gaffe" (Feb. 26, page 34). I foresee applications at my site for full-duplex gigabit Ethernet, but not half-duplex. But it is hard to say what we'd be willing to pay for gigabit Ethernet. It depends on what kind of products support it (hub uplinks? routers? our favorite kind of server?), as well as my site's usage trends, which we cannot predict with certainty.

It is time vendors recognize that full duplex, switched LANs are going to be as important as the carrier-sense multiple access with collision detection, token-ring and demand priority methods.

When I first heard the glimmer of a rumor about gigabit Ethernet, I immediately assumed it must be a full-duplex, switched standard and figured the 802.3/802.12 factionalism would not enter into it because CSMA/CD would be of such limited use. If each access method requires a different committee, then maybe both committees should bow to a new one dedicated to the access method known as "switched."

John Wobus

Syracuse, N.Y.

The battle continues

Thank goodness I read the letters in "Message Queue" (March 4, page 43)
See Message queue, page 90

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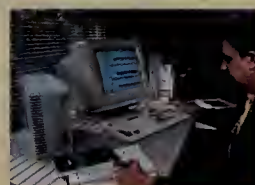
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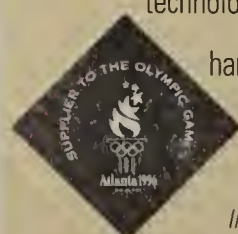
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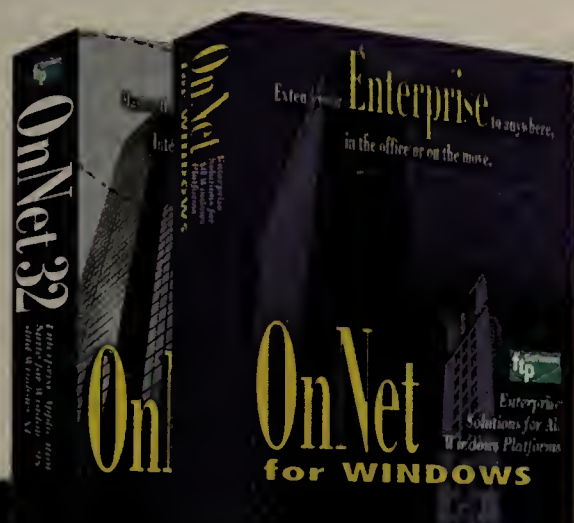


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Customizable, intelligent install addresses user requirements	YES	NO	NO
Optimizes your network connections with advanced 32-bit TCP/IP VxD kernel	YES	NO	NO
Views, prints, converts documents and graphics without originating applications (KEYview™)	YES	NO	NO
Automatic network connection from the road or office (IP Switching)	YES	NO	NO
High-speed connectivity to anyone, anywhere (ISDN, X.25, CDPD)	YES	Partial	NO
Dynamic network connectivity with automatic router discovery and router fallback	YES	NO	NO
Advanced network troubleshooting tools keep you connected	YES	Partial	YES
Automatic scripting allows easy, one-click access to your most frequent connections	YES	NO	NO
Protects valuable data with Internet firewall support for your PC (SSL, SOCKS, ANS, others)	YES	NO	NO
Increases desktop flexibility by allowing you to run Netware applications over IP	YES	NO	YES
Seamlessly coexists with other enterprise networks (NetBIOS, Vines, IPX/SPX)	YES	NO	YES
Single vendor for host access, resource sharing, transport, Internet client and server with a worldwide sales and support organization	YES	NO	Partial

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Message queue

Continued from page 89

before tossing out my firm's Macintoshes and replacing them with the latest Wintel machinery. I'm glad that I'm not the only Mac networker that reads *Network World*.

My firm has used networked Macs since 1987 and since that time, has never had to hire, much less retain, a networking consultant. While other firms were

using computers as smart typewriters, we were able to establish a collaborative network long before our competitors, and do it cheaply and reliably.

Standards are nice, but if they don't contribute to end users' productivity, they hurt rather than help an organization. It's the network professional's job to provide the tools best suited for the task to be done, not those that are easiest to administer.

If the Macintosh is doing the job for your organization, tossing it aside for the more newsworthy Wintel machines seems to be a rather ovine response, and, as we all know, it's the fate of sheep to be shorn.

Tyler Williams III

Attorney

*Baker, Williams and Green
Keysville, Va.*

Let's state for the record: With all the

business mistakes Apple has made, the Macintosh could only have survived by being "insanely great."

That said, we also need to admit Apple priced the Macintosh into a niche market. Software for the Mac is released later than for Windows machines — if it's released at all. The choice of peripherals is smaller, and they cost more.

The things that at one time you could only do with a Mac, you can now do with a Wintel machine. When users are ready to upgrade, I point this out. Very few choose to stick with Macs. That's the bottom line.

David Schaffer

Consultant

*There Must Be A Better Way
South Norwalk, Conn.*

Death notice

Your editorial on how Notes will survive (March 4, page 42) was making me a believer until the closing line: "...the Network Notes debacle will quickly fade if IBM can grab the intranet opportunity that lies before it." Notes is dead!

Steve Biese

Network administrator

Black's Guide, Inc.

Gaithersburg, Md.

Key advantage

Your article "Upgrade paths to faster token ring vary" (March 11, page 14) missed the key point that dedicated token ring's (DTR) biggest advantage and initial application is to allow microsegmentation of rings, dramatically increasing network performance without requiring any changes at the endstations. Even the classic concentrators in the wiring closets can be reused and attached directly to switch ports to effect the microsegmentation.

An analysis of where increased performance is required today reveals that it is in the backbones, bridges and routers. Migration from shared LANs to microsegmented LANs provides more than enough bandwidth to the endstations.

As new high-end servers that can effectively process 16M bit/sec full-duplex traffic come on-line, they will be equipped with full-duplex token-ring adapters and will be attached to dedicated switch ports. Existing stations will maintain their connection to classic token-ring concentrators, which will, in turn, attach to DTR concentrator ports.

DTR's ability to continue using today's hardware during the migration process to higher performance is its major strength and a major benefit to token-ring users. The next generation of endstations will have the performance capability and requirement to be directly attached to token-ring switches for full-duplex performance.

Robert Love

Senior engineer

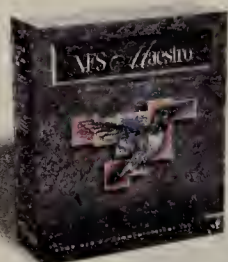
IBM

Research Triangle Park, N.C.

and vice chairman

IEEE 802.5 Token Ring Subcommittee

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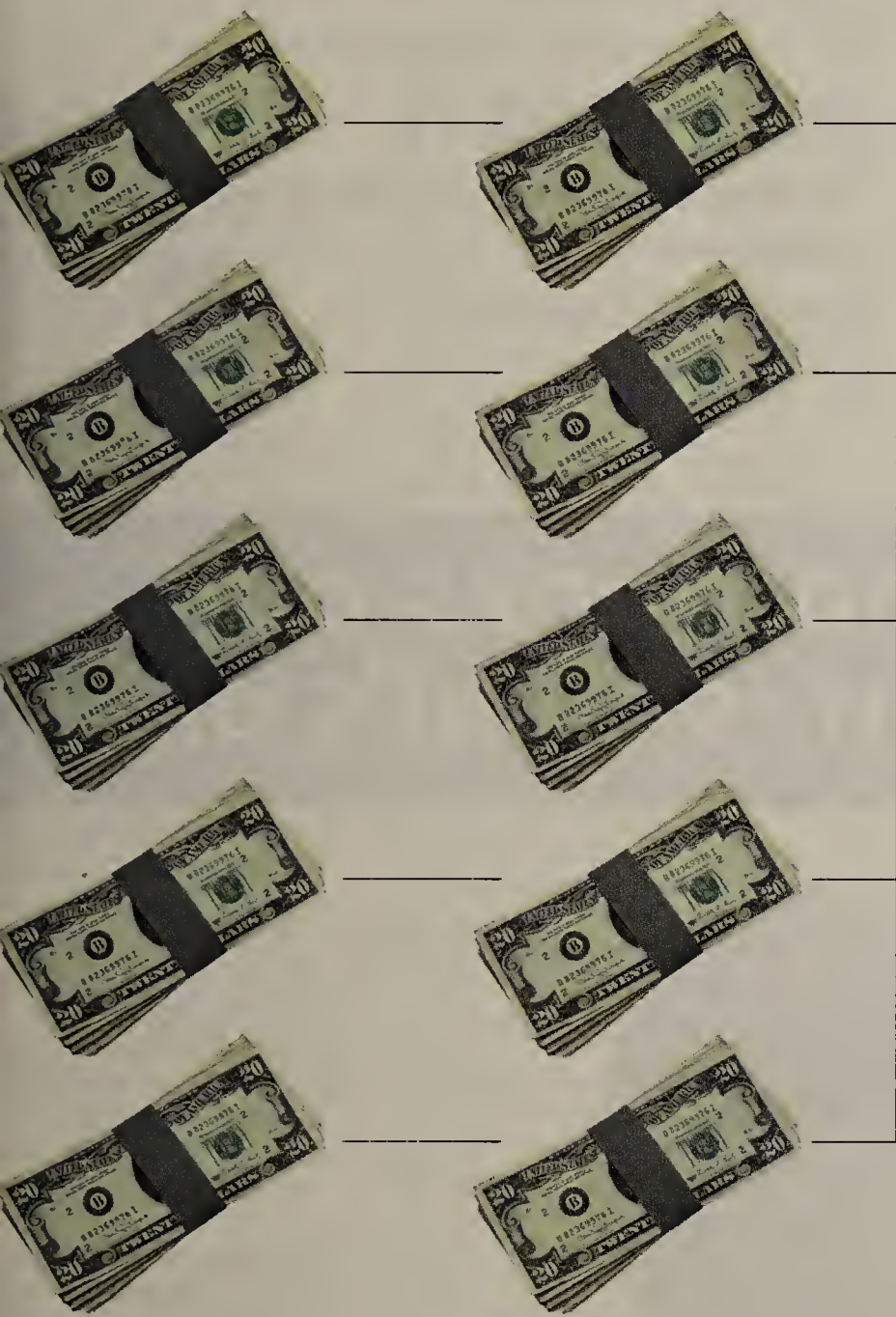
- Windows NT
- Windows 95
- Windows for Workgroups
- Windows 3.1 and DOS

Key Features:

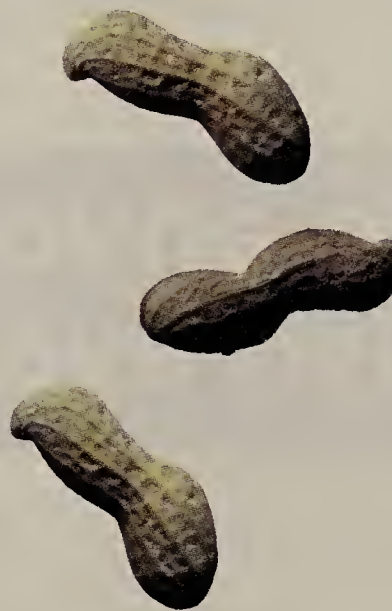
- Extensive suite of support utilities such as Ping, Finger, Trace Route, Graphical FTP, LPD and others
- Basic, Launch Pad, TN3270, TN5250
- NFS Maestro for NT and Windows 95 Includes a 32-bit multi-threaded kernel-level implementation. (Available for Intel, MIPS, Alpha and Power PC)
- NFS Maestro for Windows and DOS includes a 32-bit VxD-based TCP/IP with BOOTP and DHCP support
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Briefs

■ **Walker Richer & Quinn, Inc. (WRQ)** has a new technical support plan for its large customers.

The fee-based **Help Desk Plan** supplements WRQ's existing Primary Support Plan, which is included for free with the firm's Reflection connectivity software.

The new plan guarantees users will get a technical response from WRQ support staff assigned to their account within a prescribed time.

It also offers product training, on-site installation support and a toll-free support number. Companies can sign on for one or two years at an annual base price of \$15,000 for up to 500 users.

The Primary Support Plan lets users reach WRQ support staff from 5 a.m. to 5 p.m. PST or on-line with no guaranteed response time.

WRQ: (800) 872-2829.

■ **Novell, Inc.** this May plans to offer its **NetWare 4 Training Extreme** program to NetWare 3 Elite users who are Certified Novell Engineers and qualified students.

The program is a crash course in NetWare 4.X for users who are very familiar with NetWare 3.X and will be offered through qualified Novell Authorized Education Centers. The program squeezes eight days of training into five days.

Novell: (800) 638-9273.

■ **Learning Tree International** and the **Institute for Certification of Computing Professionals** will hold free briefings this spring on the benefits of certification, qualification requirements and exam preparation options.

The sessions, scheduled from 7:30 to 9:45 a.m., will be held in Washington, D.C. on April 23, Boston on April 24 and New York on May 7.

To register, call Learning Tree at (800) 843-8733.

It may be time for hiring committees to adjourn

By Frank Schoff

The jury is still out on whether self-managed workgroups and flat organizational structures bring to recruiting the same benefits they provide to other areas of corporate America.

But early returns indicate they may hinder hiring by needlessly dragging out the process. That makes it more costly to fill positions and more likely that you will lose strong candidates to companies — even competitors — that move more swiftly.

Consider recruiting in the good old days — just a few years ago. When a position was vacated or a new one created, the hiring manager developed a set of qualifications that would make a candidate attractive. The qualifications were then given to the human resources (HR) director so the position could be advertised.

HR screened candidates for a qualification match and passed along the strong contenders to the hiring manager. The slate of candidates was narrowed to one or two finalists, who might also have met the hiring manager's boss. A candidate was selected and an offer extended. If things went well, the process was wrapped up in 30 to 60 days.

Time-consumer

Fast-forward to today's so-called nimble organizations — the ones with flat structures, self-managed teams and an average work week for most professionals of 60 or more hours.

The hiring manager's first step is to meet with the team of

people that will become the new employee's peers to gather their input on the skills and qualities desired. With increasing frequency, these requirements include not just tangible skills and experiences, but also the soft skills of behavior patterns and personality traits.

The hiring manager then meets with HR to translate all this information into a set of recruiting specifications, which are then advertised. Only this time around, few applicants make it through the initial screening process because the specifications are very detailed.

Those who manage to tear a hole in the tough screening process go on to an interview with the hiring manager, which turns out to be another screening process. That's because the hiring manager is looking for candidates that can be recommended to an interview committee of three to five people. These committee members can include the hiring manager's peers, the people a new employee will work with or even a customer of the company.

This is where the problems begin. The hiring manager is usually working a 60-hour week and juggling a variety of assignments, obligations and problems — all of which seem to take higher priority than interviewing. As a result, the introductory interview, which should be conducted within a week of receiving a resume, is now taking up to four weeks to complete.

Add another four to eight weeks to allow candidates to meet with interview committee members who are also working 60-hour weeks. Because they are not directly responsible for the ultimate hiring decision, committee members may be quick to assign low priority to interviewing candidates.

Increased interviewing time is not the only drawback to the committee approach. Even though committee members are supposed to interview based on the job specifications, each will bring personal perspective into the process.

Add to these differing views the nebulous but critical factor of personal chemistry and the

likelihood of universal approval for a candidate is slim.

After each committee member finishes an interview, the hiring manager has to gather feedback — another time-consuming process. The inevitable differences among interviewers must be discussed and resolved. Then a finalist may still need to be referred to the hiring manager's boss for yet another inter-

view. Depending upon the role the boss wants to play, the finalist is accepted or rejected.

It's important to recognize the risk of leaving positions open too long, causing the best candidates to go elsewhere out of frustration.

The pains inflicted by a drawn-out hiring process

- ▶ The work associated with an unfilled position goes undone or is spread among an already overtaxed staff unless a contractor is brought in.
- ▶ Each day a position goes unfilled takes potential revenue-producing value away from the company.
- ▶ Highly qualified, aggressive job hunters may interpret a company's inability to move the hiring process along as a statement that the position is unimportant or the individuals involved lack the professional discipline to manage a recruiting process effectively.
- ▶ Qualified applicants that are considering multiple opportunities will likely be lured by another company's offer before completing an extended interview cycle.

Good or bad?

This protracted hiring process can indeed produce a better match, assuming that it leads to candidates who are totally acceptable based on all hard and soft skills.

However, it could push hiring managers to the point of diminishing returns where the losses incurred during the extended interview cycle exceed the gains (see graphic).

As long as corporations con-

The solution for eliminating steps in this drawn-out process lies in the hands of those responsible for hiring, and therein lies the problem. You may find yourself mired in working on a committee that is charged with making sure the committee for the discontinuation of committee hiring is making progress.

Schoff is president of Management Recruiters in Cedar Mountain, N.C., and specializes in the placement of networking professionals. He can be reached by phone at (704) 884-4118 or by fax at (704) 884-3512.

CyberPayments conference taking shape

The National Automated Clearing House Association will hold a conference to address making payments across the Internet.

Sponsored by Microsoft Corp. and CyberCash, Inc., the CyberPayments '96 conference will be held June 18-19 at the Hyatt Regency in Dallas. Attendees will get a handle on what is being done to overcome security concerns that have clouded the use of the Internet for automated clearing house, credit card, debit card and other forms of electronic payment.

Representatives from the vendor community and a number of leading banks, including the Federal Reserve Bank, will shed light on the infrastructures they have built to make electronic payments across the Internet more secure.

For more information, call Financial & Business Media Associates, Ltd. at (800) 529-7375.

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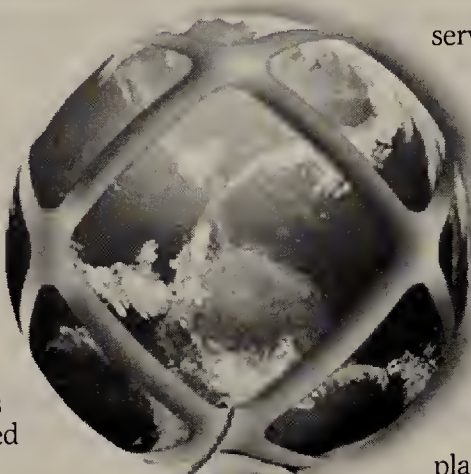
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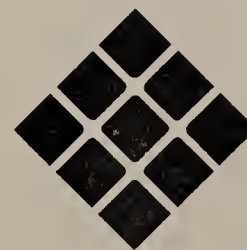
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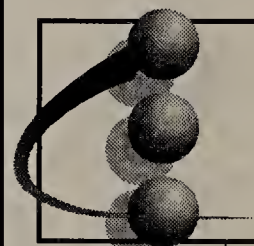
Project Leader candidates should have hands-on experience implementing the above technologies, complemented by troubleshooting skills with diagnostic tools such as a protocol analyzer.

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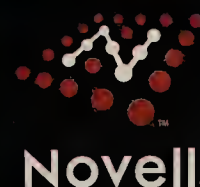
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You will use your well-developed digital design skills to fill the role of project leader. Such skills should include experience in the areas of network interconnect devices, bridges, routers, switches and repeaters. Knowledge of Ethernet, Fast Ethernet, FDDI, ATM or ASIC design experience a plus.

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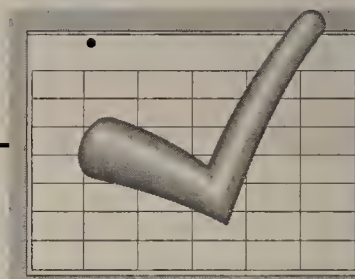
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5/13	Tests/Reviews: Low-end-Hubs	May 1

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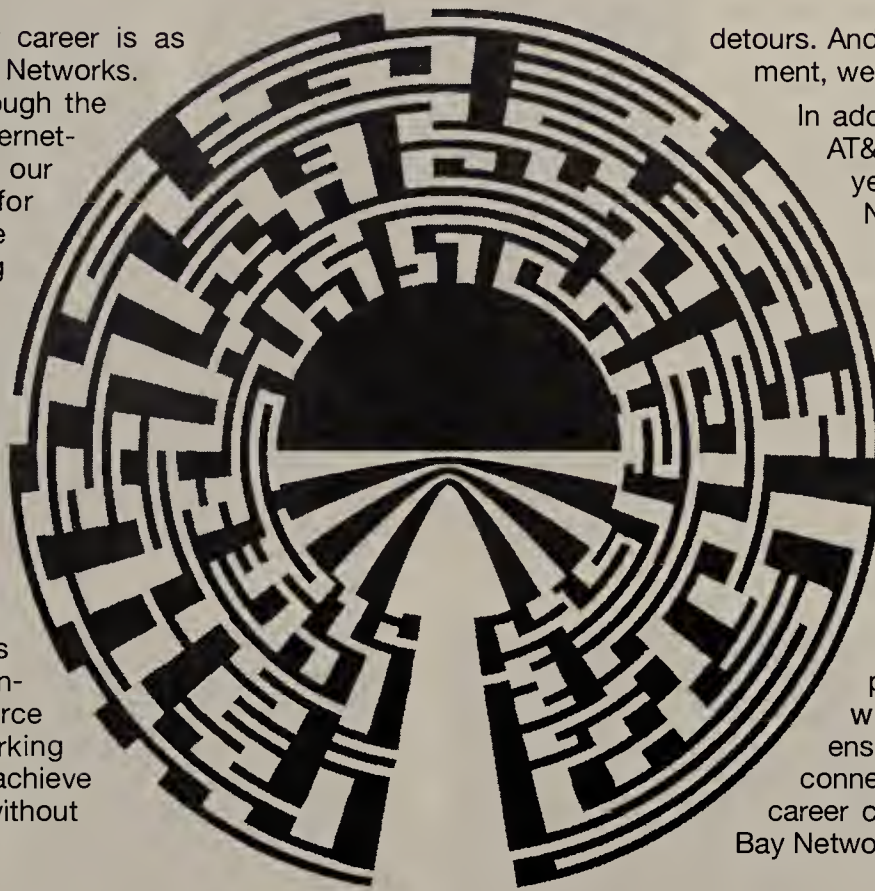
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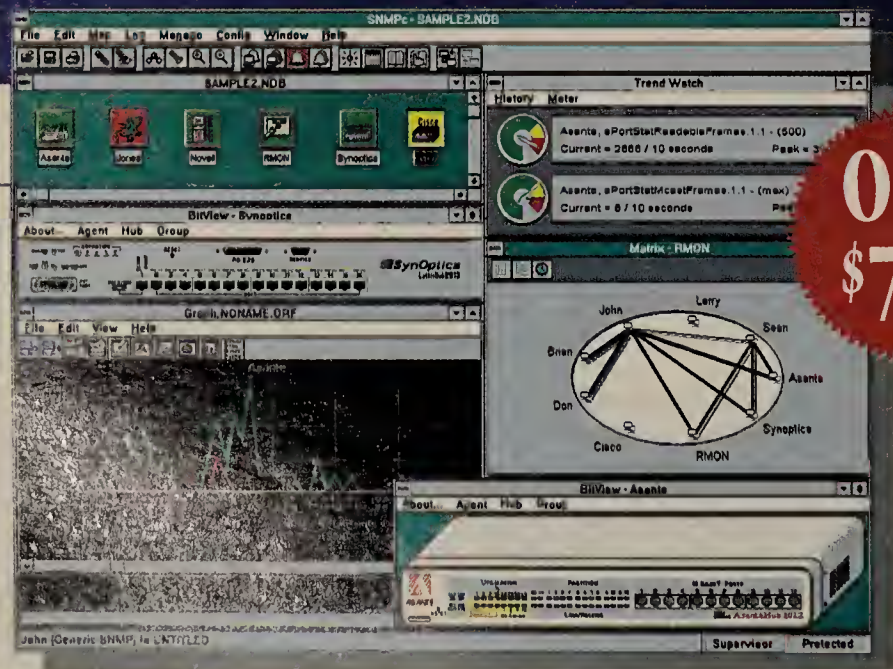
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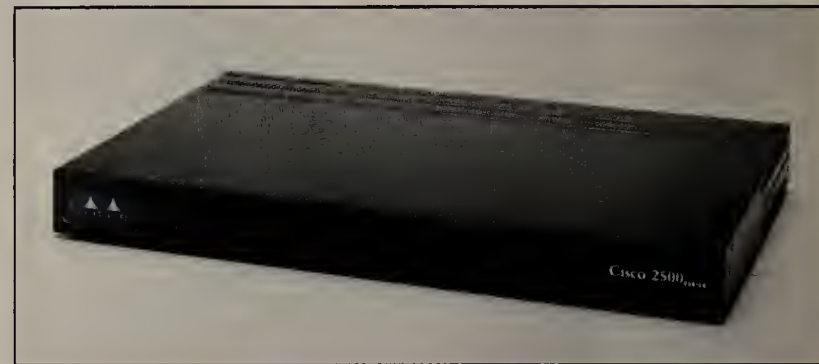
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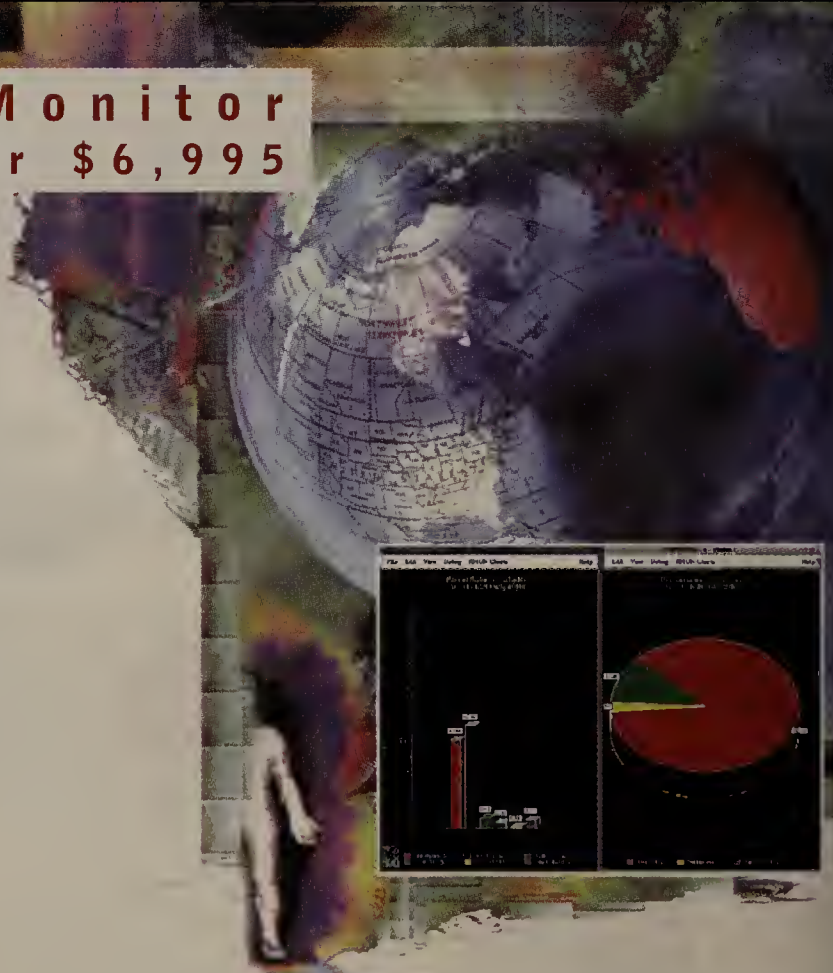
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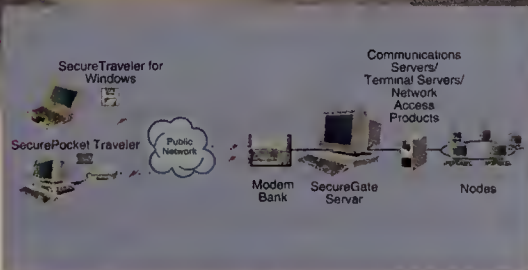
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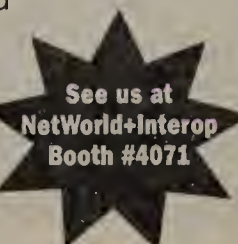


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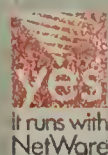
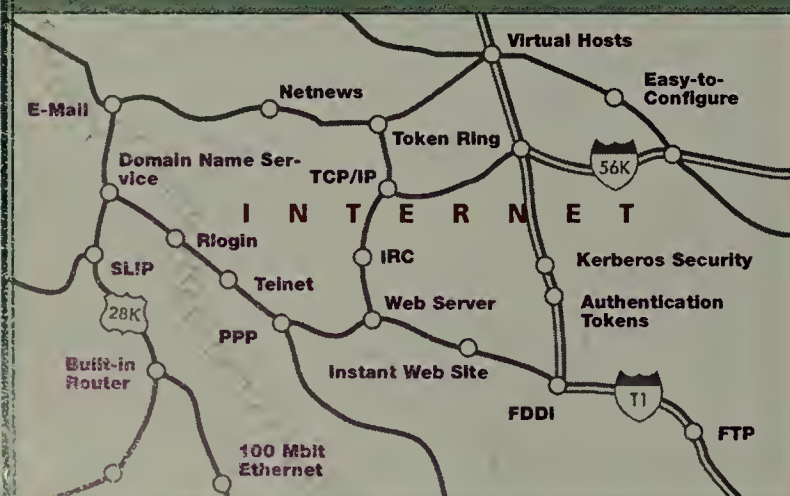
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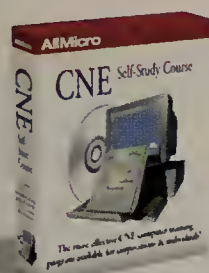
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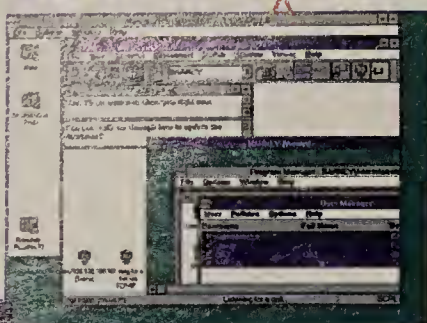
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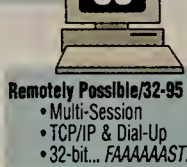
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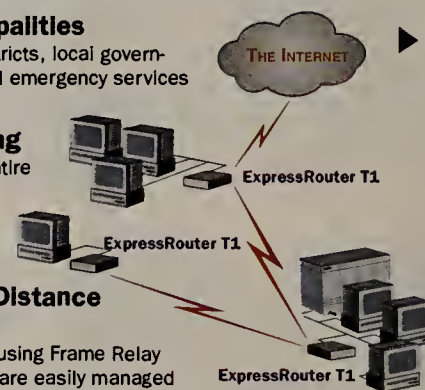
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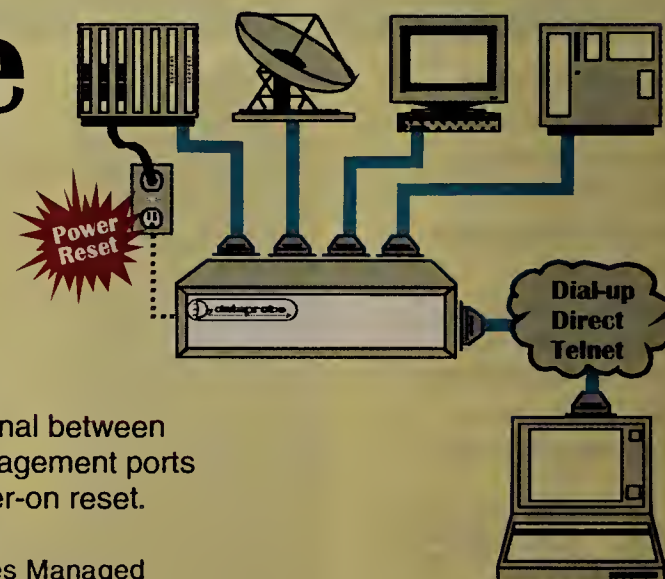
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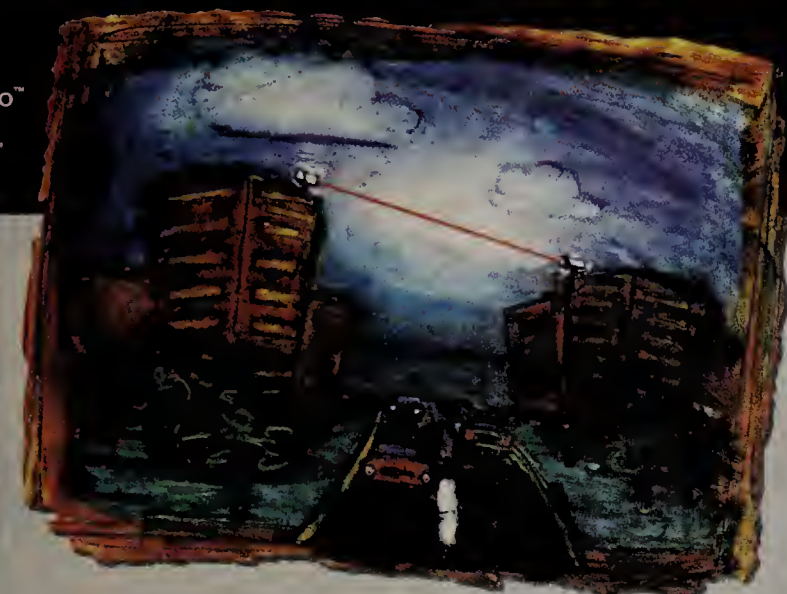
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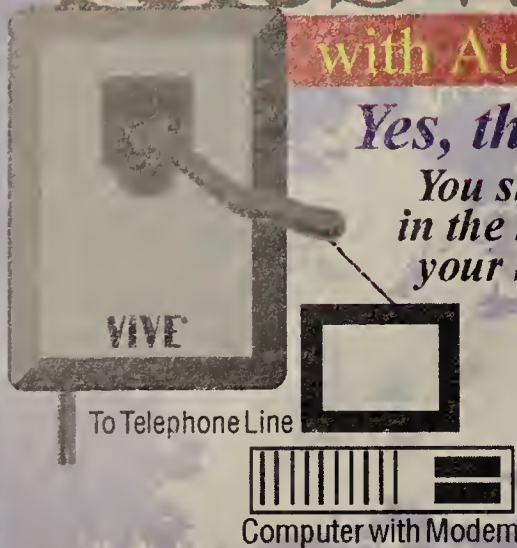
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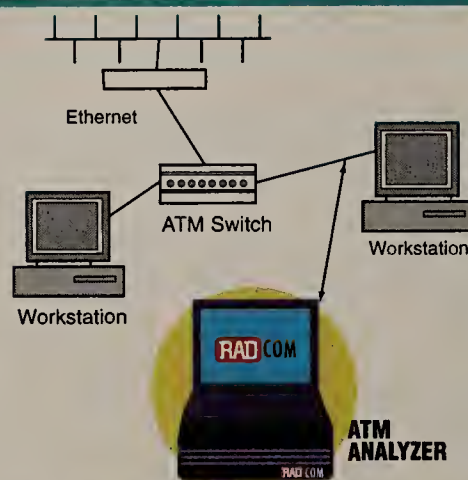
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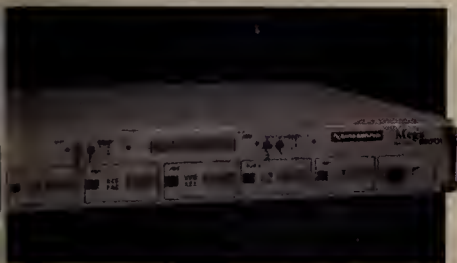
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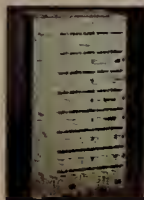
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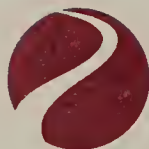
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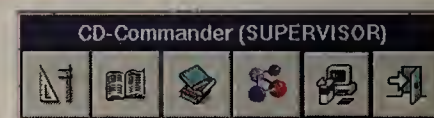
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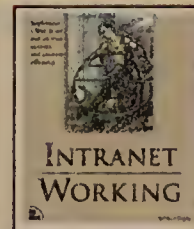
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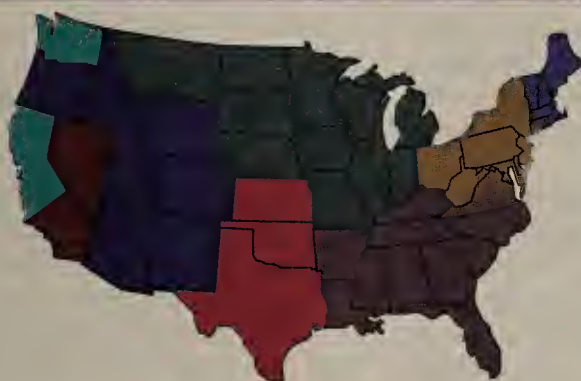
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Sun tools highlight intranet package

Products make it easy for corporate customers to build internal networks based on 'Net.

By John Cox and Ben Heskett
New York

Like everyone these days, it seems Sun Microsystems, Inc. has intranet fever.

The company — led by Chief Executive Officer Scott McNealy — last week trumpeted a bevy of new products intended to make it easy for corporate customers to build internal networks based on Internet and World-Wide Web technologies.

Key products include a software development tool set and object-oriented communications middleware, both written in Sun's Java language. These are aimed squarely at corporate developers struggling to build Java Internet applications.

When all the products become available (see graphic), they should create a fairly complete framework for deploying a corporate intranet. "It certainly gives us some capability on the Web that we've been asking for," said David Swan, director of information services at Group Health Cooperative in Seattle.

Sun announced three object-oriented Internet development tools:

■ **Java WorkShop.** A development environment for building Java applets.

■ **Joe.** Java-based, CORBA-compliant middleware for linking Java applets in the browser with existing business applications.

■ **Internet WorkShop.** A client/server development environment that includes Java WorkShop for client development and Visual WorkShop for

C++, as well as Solaris Neo tools for server development.

"Java WorkShop is a very interesting piece of work. It's the first Java development environment written in Java," said Evan Quinn, research manager for application development tools at International Data Corp.

That means Java WorkShop runs inside its own Web browser (and eventually, probably in any Java-enabled browser), and offers an entirely new user interface for building Internet and intranet applications.

"It's pretty easy to see Java WorkShop, within the 1996 time frame, becoming a platform-independent tool the likes of which we've never seen before," Quinn said.

What's up with Joe?

The Joe object-oriented middleware is a set of Java applets that form a compact (about 50K bytes) object request broker, based on the Object Management Group's Common Object Request Broker Architecture (CORBA).

A browser connects to a Web server and downloads Joe, which then handles interactions between client Java applets and server-based business applications. These server applications can be written in C or C++ and managed by Sun's Neo object request broker.

According to Brian Croll, Sunsoft, Inc.'s director of marketing for object products, this approach lets corporate developers create what amounts to a

Java wrapper around existing business applications. Once that's done, any Java applet can access the application. "At deployment, Java is entirely transparent," Croll said. "And the application developer never sees Joe either. He uses the Java hooks [and Joe connects the client] to the server business application."

Netra family broadens

On the hardware end, Sun unveiled three new models of its Netra Internet server. The UltraSPARC-based servers come bundled with Web publishing and security software. In April, company officials said Sun will announce a new top-of-the-line Internet server, bundling one of its most powerful multiprocessing UltraSPARC servers with the Netra core software.

In the security arena, Sun announced updates to SunScreen and Solstice Firewall-1. SunScreen, formerly a U.S.-only product, will now be available worldwide.

Sun also unveiled Solstice Internet Mail, which officials said is the first commercial implementation by a major vendor of the Internet Message Application Protocol 4 (IMAP4) Internet mail standard. IMAP4 is a client/server mail protocol that is platform-independent and gives Internet mail clients the ability to manipulate and manage E-mail on servers instead of simply moving messages back and forth over the Internet. ■

Group forming to license Java applets

● A copyright attorney is spearheading an effort to license Java applets, which are difficult to protect as intellectual property because of the manner in which they are distributed on-line.

Licensing agreements are also needed to protect developers from liability, said Jonathan Ezor, a new-media attorney at Davis & Gilbert in New York and general counsel for jade.org: The Java Developers Organization.

Packaged software comes with a printed license agreement, and downloaded software includes an on-screen license agreement that addresses copyright and warranty, he said.

"But for most Java applets, they just run. You never install an applet. You load a Web page and the applet is downloaded automatically, so the ordinary models for licenses don't work," he said.

Ezor's group is proposing a licensing method whereby the user would agree on-screen to the terms of a licensing contract when first encountering a Java applet, and that agreement would last the duration of the user's browser session or some other predetermined period of time that the user is on-line.

Members of jade.org could choose to have their applets covered by the form license agreements, and applets of nonmembers would not be affected. Code in the members' applets would scan information in the user's computer, possibly in RAM, and detect whether the user has entered into the licensing agreement during the browser session. If not, the member applets would not download.

Waiter, there's a bug in my Java

● Princeton University researchers have discovered a bug in Sun Microsystems, Inc.'s Java programming language, which could give hackers carte blanche to access users' computers.

"The consequences of the flaw are pretty severe," said Edward Felten, an assistant professor of computer science at Princeton who helped discover the bug. "Any operation that the PC is allowed to perform, the attacker is allowed to perform," including reading and altering files, he said.

At risk are the majority of users who employ Netscape Communications Corp.'s Navigator to browse the World-Wide Web, Felten said.

But they will not be at risk much longer, according to Sun. The company's engineers "already have the fix and they're testing it right now," said Geoffrey Baehr, Sun's chief networking officer.

Routinely, when users download instructions from the Internet, a byte code verifier assesses whether the downloaded applet actually performs the functions it says it does. Usually, the system can detect if an applet contains hidden, hostile code, but Princeton researchers found a way to slip hostile applets past the verifier.

Java creators jump ship

● Several members of the Sun Microsystems, Inc. group that created the Java object-oriented programming language have formed a start-up company to develop Java applications.

The as-yet unnamed Palo Alto, Calif.-based company is being formed by two former senior engineers at Sun — Sami Shaio and Arthur van Hoff — as well as Kim Polese, a former marketing manager for Java. They left Sun in January.

"This shows there is an industry happening" around Java, a Sun spokeswoman said.

Compiled by Elinor Mills and Rebecca Sykes, IDG News Service correspondents.



Sun burns up 'Net market with new products

Product	Description	Price	Availability
Netra Internet servers	Six models with MicroSPARC II chips or 64-bit UltraSPARC processors. Bundled with Sun's Firewall-First! security product, an HTML-based administration software package, Netscape Web software and more.	\$7,496 to \$24,395	This month
Joe	Middleware for linking Java-based applets to server-based business applications.	Free	August
Java WorkShop 1.0	A Java-based development environment for creating Internet applications and Web pages.	\$295	May
Internet WorkShop	A development environment for building Internet and intranet applications using a combination of Java and C and C++ tools.	Not available	September
Solstice Internet Mail	An E-mail product with a Solaris-based IMAP server component and Windows 3.0, Windows 95, Windows NT and Solaris clients.	\$995 per server.	May
Solstice Firewall 1.2.0	Software that provides security between corporate intranets and the Internet or within intranets.	\$4,990 per network and 50 clients; \$7,980 for base product with encryption.	Now
SunScreen SPF-100G	A hardware and software product that adds security to applications running on intranets and the Internet.	\$21,995 for SunScreen SPF-100G; \$7,995 for SunScreen Administration Station G	This month
SunIntegration Internet Practice	Internet and intranet consulting service.	Varies	Now

Mobile communications

Smart phones, PDAs are getting smarter

By Joanie Wexler

The market for personal communicators has been a bust so far, but that is not stopping vendors from rolling out new and improved handheld products that bundle Internet access, voice capabilities and more.

Motorola, Inc. is poised to announce an upgraded version of its Envoy handheld communicator this week that will let customers tap into their LAN-based electronic mailboxes.

The Envoy 150 will run Mail on the Run by River Run Software Group, which lets customers connect to their corporate electronic mail server and get cc:Mail or Microsoft Mail messages while mobile.

Lack of connectivity to corporate resources has been a failing of personal communicators so far, said Andrew Seybold, a wireless consultant and editor of the "Outlook on Computing and Communications" newsletter in Boulder Creek, Calif. Seybold conducted a recent end-user survey that indicated desktop connectivity was far and away the main feature mobile users wanted, while access to public mailboxes barely registered any interest.

Tim McCarthy, Motorola business manager of wireless communicators, said his company's research jibes with Seybold's. "[Getting] news and stock quotes are icing on the cake. But the cake is corporate information," he said.

Customers can expect future Envoy enhancements to include connectivity to databases and group schedulers.

Mitsubishi weighs in

Separately, at last week's Cellular Telecommunications Industry Association (CTIA) Wireless '96 conference in Washington, D.C., Mitsubishi Wireless Communications, Inc. demonstrated a phone dubbed MobileAccess that sports Internet access, two-way paging, E-mail, facsimile and voice applications.

The phone, scheduled to ship in the third quarter, comes with a 2-character-by-four-row display on the handset and includes both analog cellular and Cellular

Digital Packet Data links.

Northern Telecom, Inc. is also readying a new smart phone. During keynote speeches at both the CTIA conference and Technologic Partners' Mobile Forum '96 in San Francisco last month, General Magic, Inc. Chairman



General Magic's
Porat says Nortel's new smart phone has "the killer application for a mobile machine."

Marc Porat flashed prototypes of a Nortel smart phone, code-named Orbiter, running his company's Magic Cap operating system. The phone is slated to be outfitted with an Internet browser, which Porat described as "the killer application for a mobile machine."

Not everyone is so sure about that, though. Tim Schmidt, principal of Encore Consulting Group, Inc. in Altamonte Springs, Fla., wondered just "how much 'Net information are you going to be able to receive [on small phone displays]." ■

Wireless Internet services looming

Ameritech Cellular is set to launch initial, bare-bones service this month.

By Joanie Wexler

Chicago

Later this month, Ameritech Cellular Services will become the first wireless network operator to offer packaged Internet services.

The company will launch MobilePartner, a rudimentary Internet services offering based around its circuit-switched cellular services, a company spokeswoman confirmed last week.

For \$149, the company will provide a Compaq Computer Corp. PC Card Type II cellular modem, cable, Internet electronic mail software from InfoExpress, Inc. in Los Altos, Calif., and a month's free Internet messaging service.

After the first month, however, users will pay Ameritech's regular cellular rates. The air connection takes them into an Ameritech modem pool; from there, Ameritech will run a wired connection to an InfoExpress mail server that sits on the 'Net. InfoExpress will provide Internet access and bill the user separately for that service, explained Todd Nakano, direc-

tor of business development at the company.

The service could cost users a fair penny. "Aarrghh!" exclaimed Iain Gillott, wireless research director in the Austin, Texas, office of research firm International Data Corp./LINK, indicating users would ring up large bills by having to pay regular cellular rates for 'Net activity.

The approach is to basically replace a land-line connection with circuit-switched cellular for mobility — something Gillott seriously questions. "I'm going to pay upwards of 25 cents a minute for checking E-mail?" he asked. Gillott indicated it was likely a billing system would not be able to differentiate a 'Net call, so it would be difficult to come up with deals to benefit 'Net users specifically.

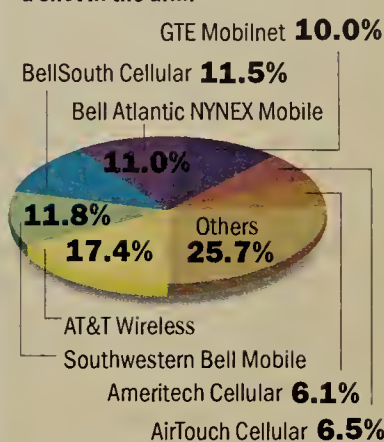
Ameritech Cellular told *Network World* in January that when it launched wireless 'Net services, it would revamp its entire pricing structure for analog cellular and Cellular Digital Packet Data services. The aim was to make 'Net access over wireless

more attractive and to lower prices for all cellular customers.

That has not happened, but the Ameritech Cellular spokeswoman said there are more announcements on deck. One likely move, analysts said, would be for the carrier to partner with a company to filter unneeded data off wireless transfers. ■

U.S. cellular market share

Attractive mobile Internet packages from the likes of Ameritech Cellular might give those carriers' business a shot in the arm.



Percentages based on number of subscribers.
SOURCE: IDC/LINK

IP hijackers

Continued from page 1

What happened to Shimomura was clearly sabotage. Shimomura has a Web site — www.takedown.com — to advertise his book *Takedown* about how he helped capture hacker Kevin Mitnick. A prankster sent an E-mail form in Shimomura's name to the InterNIC asking to change the domain name from "takedown" to "takedown." The InterNIC automatically processed it, leaving Shimomura temporarily lost in cyberspace.

The incident highlighted just how vulnerable the InterNIC can be to unauthorized name changes.

"Our investigation indicated the request to modify the domain name was submitted by some unscrupulous person who knew how to appear to be the domain name holder and routed the E-mail through several locations," said Dave Graves, business manager for the InterNIC.

But most unauthorized domain name changes have less dramatic explanations. Oftentimes, it is simply that the Inter-

NIC has goofed up and not followed its own instructions for processing domain name changes.

Richard Johnsson, is a software programmer in Palo Alto, Calif., who looks after the domain name server for his wife's business, Hamilton Communications. One day, he received an E-mail message from the InterNIC that said all Internet traffic to hamilton.com would be routed to the IP address for the server at digiweb.com.



Richard Johnsson
was one victim of IP hijacking.

"I never requested that change, and I'm the only person listed as a contact on the InterNIC's own contact list for hamilton.com," Johnsson said. Johnsson immediately contacted the InterNIC and Web hosting service company, DigiWeb, Inc., and stopped the change before the InterNIC's Global Domain Name Server propagated the misinformation to the rest of the Internet domain name servers.

"Once my domain name was hijacked, nobody would be able to contact us," Johnsson said.

DigiWeb President Alan Chong said the mistake, which affected about a dozen other people, occurred because DigiWeb is in the process of changing

Internet service providers. DigiWeb's current ISP uploaded all the name service records from the DigiWeb server and sent it to the InterNIC to modify the IP addresses, Chong said. A DigiWeb customer had requested the domain name hamilton.com, and the name was stored in the DigiWeb server.

"It was a mistake, and the InterNIC shouldn't have authorized the change in the first place," Chong said.

The DigiWeb incident has not been resolved to Johnsson's satisfaction. In fact, Chong is still listed as a contact for hamilton.com at the InterNIC.

Rules are made for a reason

The official InterNIC procedure lets either the technical or administrative contact listed on a domain name record make changes or delete the domain name by simply sending in an E-mail form.

Although the InterNIC professes to follow a strict regimen of checking originating IP addresses and contact names before making changes, the reality is quite different.

Shirl Grant, net administrator at the Pittsburgh Supercomputing Center that handles domain name service for ISP PrepNet, said she was able to make name

changes even though she is not an official contact.

"The InterNIC is not enforcing its own policy," she said.

When pressed, the InterNIC admits as much. If a name change request comes in from an established ISP, the InterNIC will tend to put the change through regardless of the contact names, officials confessed.

"We have to strike a balance so the domain name holder won't be out of service for several weeks while we're waiting to get his permission," the InterNIC's Graves said.

The InterNIC recognizes its security procedures for authenticating domain name requests needs to be improved. To that end, the InterNIC hopes to have a new registration system called Guardian running in a few months. Guardian will let the technical and administrative contacts for domain name holders submit requests using encryption and digital signatures.

But the blame for IP hijacking can't always be placed at the feet of the InterNIC, the ISPs or unethical pranksters. The InterNIC has seen cases when a disgruntled employee listed as the corporation's domain name contact has requested changes or deletions harmful to the company's interest. ■

Intranet

Continued from page 1

with intranets, but these experiments show both the promise and pitfalls ahead.

Take a 486 PC, add TCP/IP software, Web server software and a bunch of files formatted in HTML, and presto! Information once confined to a filing cabinet or a PC hard drive now can be viewed and downloaded by anyone in the company.

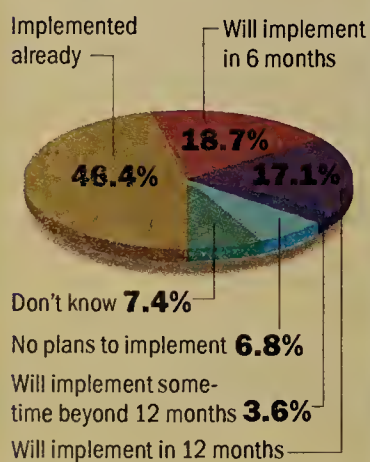
"It works, and if you've got the network infrastructure for it already, it's real cheap," said Wayne Fowler, vice president of information technology at the Toronto Stock Exchange.

No more predictability

But the fast growth of Web and other Internet servers, such as File Transfer Protocol (FTP) servers, is creating a highly unpredictable computing environment. So far, performance and net management issues do not seem to be burdens for most companies, users report. That is mainly because most Web sites and the number of users accessing them remain small.

Intranet implementation

Has your company implemented an intranet strategy, and if not, will you be implementing one in the next 6 or 12 months?



SOURCE: IDC/NETWORK WORLD SURVEY

But Jet Propulsion Laboratories (JPL) in Pasadena, Calif., saw the Web browser population jump in 1994 from five to about 4,000 computers. And Allied Signal Aerospace in Torrance, Calif., has seen its network traffic volumes explode, due in part to the dozens of Web sites that have sprung up, according to Paul Hoedeman, chief information officer at the Allied Signal Corp. subsidiary.

For those without a TCP/IP infrastructure in place, creating one for an intranet is the first and biggest cost. Where companies have most of this already, the costs of initial intranet deployment seem to be very low.

Intranet deployment almost

universally seems to be driven from the bottom up by business users.

"There are individuals [in business units] who have access to very cheap implementations of Internet technology," said Nancy Wong, manager of computer and network operations at the computer and telecommunications services group at Pacific Gas & Electric Co. in San Francisco. "They're doing this under the hatches to improve their business processes."

At Allied Signal Aerospace, Web sites have been mushrooming for about two years. Today, there are dozens and about 5,000 users with access to them, according to Hoedeman. Significantly, the division has just hired its first full-time security expert "to make sure we keep up with the risks as the intranet develops," Hoedeman said.

Standard formats and access

"We have Windows PCs, Unix workstations and Macs, and finding a way to disseminate the same document to all three of those groups, until now, has been almost impossible," said Alan Stepakoff, member of staff in institutional computing and information services at JPL, which has an estimated 200 active Web servers.

That is not to say intranets are easy. "The real problem is getting documents in and out of the Web server," Stepakoff said.

A few companies are going beyond document storehouses to use the Web as an application platform. Detroit Edison Co. moved its corporate phone directory from a mainframe to an Oracle Corp. database on a Unix server and created an HTML form on its main, or home, internal Web page.

Getting a grip

Growing sites such as JPL and Allied Signal Aerospace are just now starting to look at rationalizing haphazard intranet growth.

"The servers are very easy to maintain," Stepakoff said. "But with that many, things like updating software and security management would be a lot easier to deal with on fewer machines."

Web pioneers at Pacific Gas & Electric are just starting out, and the company's goal is to create an architecture that will support intranet growth, Wong said. The architecture will guide the company in making changes to the network infrastructure, defining standards at all levels, selecting tools and administering the whole system management life cycle of applications and products, Wong said. ■

IBM

Continued from page 1

building hybrid frame relay and Asynchronous Transfer Mode products, will work with IBM to build top-of-the-line backbone switches. As a first step in their partnership, IBM will adopt Cascade's B-STDX 8000 and 9000 backbone/carrier cell switches as its high-end Nways 2230 Models 600 and 650.

Since the firm first announced in 1993 its intent to be king of the ATM hill, IBM has claimed its technology is superior to the competitors' but has offered little product to back up that claim.

In fact, its ATM switch family will not actually support ATM links until later this year — three years after it was first announced (NW, March 11, page 1).

While the Cascade deal will help IBM become a prominent switch player, it is a signal that IBM is apparently no longer beholden to its own technology.

"This is an embarrassment for IBM," said Atul Kapoor, a principal of Kaptronix, Inc., a consultancy in Haworth, N.J. "A few years ago, they said they wanted to be 'The ATM company.' Now they have to go to Cascade for some of the most important products? It doesn't make much sense."

IBM sees the agreement another way.

"We view this agreement as one of the first steps we'll be taking to rebuild our leadership position in the networking technology industry," said Lutz Hahne, general manager of IBM's Networking Hardware Division.

As expected, IBM also announced an expanded agreement with Sync Research, Inc. to resell the FrameNode frame relay access device and InterXchange central office FRAD. The FrameNode, to be called the Nways Model 2218, will give SNA users access to frame relay backbones (NW, Sept. 25, 1995, page 6).

The agreements — in particular the one with Cascade — have their pluses and minuses for IBM, according to observers. On one hand, the Cascade deal gives IBM instant access to proven, high-end switching technology and lets the company immediately compete for lucrative carrier network business.

On the other hand, the agreements show, once again, that in areas IBM executives define as strategic, the company is unable

to deliver homegrown products.

The Cascade box that IBM will sell as the Model 600 is an eight-slot, fully redundant switch for large enterprises and small carriers. The Model 650 is for carrier backbones and possibly enterprise corporate nets. Both devices have a switching capacity of 1.2G bit/sec and support frame relay, IP, SNA, ISDN, Switched Multimegabit Data Service and ATM traffic, as well as frame relay-to-ATM service interworking.

They replace IBM's planned Models 700 and 900 and fit above IBM's only existing Nways switches, the mid-range



IBM's Zimmer says the firm will move its IBM-specific technologies to Cascade switches.

Digital

Continued from page 1

ing (NW, March 4, page 1). Sources said Digital could underscore the significance of the relationship by purchasing a minority stake in Ipsilon.

"Nothing is precluded," said Lawrence Walker, vice president and general manager of Digital's Network Products Business.

Ipsilon was launched by well-known former employees of Cisco Systems, Inc., Newbridge Networks, Inc. and Sun Microsystems, Inc.

Analysts said the Ipsilon technology could give Digital a two-year technological lead over switching rivals such as Bay Networks, Inc., Cisco and 3Com Corp.

Digital plans to port the technology across its switches and servers over the next few months.

"It does give them a leg up at this point," said Fred McClimans, principal at Decisys, Inc., a consultancy in Sterling, Va.

Ipsilon's IP switching software fleshes out Digital's enVISON strategy of distributing routing across switching devices in a virtual network.

Distributed routing integrates frame forwarding and routing computation with the switching function, spreading routing control over multiple switches and reducing the need to get all of the instructions from a central box (NW, April 24, 1995, page 8).

These switches can also create an ATM virtual circuit to the destination, a concept Digital refers to as One-Hop Switching. This limits each connection to a sin-

Models 300 and 500.

One of the keys for IBM is that the switches are currently used by Ameritech Corp., Bell Atlantic Corp., USWEST, Inc. and others for frame relay services. MCI Communications Corp. uses them for its SMDS service.

Rob Zimmer, a senior product planner for IBM, said the firm will move its Multiprotocol Switched Services (MSS), High Performance Routing and other IBM-specific technologies to the Cascade switches. MSS is a key component of IBM's Switched Virtual Networking technology that will control the routing and traffic flow of data across IBM switches. "Users will get a high-capacity switch that is capable of handling a mix of protocols something we do not offer customers today," Zimmer said. ■

gle hop, reducing network latency, especially during connection setup.

Likewise, the Ipsilon software dynamically determines when to switch and when to route based on the needs of IP conversations.

"It's clear to us that there's some interesting stuff in their code around flow management and flow detection,"

Walker said. "That's a basic idea that they started the company with is one that we believe in and one that we think is going to go places."

Indeed, Decisys' McClimans said the Digital partnership is a major endorsement for the Ipsilon technology.

In addition to licensing the Ipsilon soft-

ware, Digital and Ipsilon will jointly develop and implement Ipsilon's Generic Switch Management Protocol (GSMP) software on Digital's Gigaswitch/ATM switches. GSMP provides call setup, teardown and call status. The companies will also incorporate Ipsilon's Flow Management Protocol (IFMP) on Digital's LAN switches, such as the Gigaswitch/FDDI, and Alpha servers. IFMP enables IP switches and hosts to exchange flow redirection messages.

Digital and Ipsilon will also collaborate on ATM switch traffic engineering and performance analysis, and routing hardware development. In addition, the companies will look to extend GSMP to non-ATM switching media, such as FDDI and Fast Ethernet, said Bill Hawe, Digital's technical director for network products. ■



Digital's Walker thinks Ipsilon is 'going places.'

Cabletron

Continued from page 1

(MMAC) switching hub, for use in the Bay 5000 chassis. The company will display the module in a Bay hub at NetWorld+Interop.

Industry observers point out that Bay customers have been clamoring for switching capabilities because Bay was originally supposed to ship its 10M/100M bit/sec Ethernet switch in the second half of 1995, and it is just now shipping.

Bob Currier, director of data communications at Duke University in Durham, N.C., said he thinks Cabletron's SmartSwitch module will appeal to Bay users.

"Bay is just now finally starting to dribble out their switching stuff so there are a lot of frustrated Bay customers out there," he said. "If users can buy the SmartSwitch and pop it into the 5000 chassis, then why not?"

But at least one analyst cau-

tioned customers about the Cabletron offer.

"I can't imagine that Bay users would want to take the risk of having the Cabletron Trojan horse module slide into their System 5000 chassis," said Michael Howard, president of Infonetics Research, Inc. in San Jose, Calif. "Unless, of course, they are ready to give up on Bay and move to another vendor's product."

Jim Hourihan, vice president of marketing at Bay, downplayed the move. "This is the equivalent of putting a hair dryer in the 5000 chassis," he said. "They are really just sucking power from our chassis and not taking full advantage of the hub."

Since Cabletron's SmartSwitch module does not connect to the backplane of the System 5000, users will have to opt for a front-panel link to connect to other hub modules, Hourihan said.

Another key drawback is that

Bay's Optivity net management application would not be able to see the Cabletron module. But Bay customers could still manage Cabletron's SmartSwitch module as a separate device using Cabletron's Spectrum Portable Management Application, which sits on top of HP OpenView, SunNet Manager or IBM NetView management platforms. Also, Bay shops using Cabletron's Spectrum management system would be able to manage the integrated Bay/Cabletron device.

Trent Waterhouse, Cabletron's product marketing manager for switching, said that modifying the company's existing SmartSwitch module for Bay's box was fairly straightforward and Cabletron may go after

other hub players.

"The difficulty is not in the hardware, but in integrating the management," he said.



Cabletron's Trent Waterhouse says his company is thinking about pursuing other hub players.

Cabletron's SmartSwitch module boasts a forwarding rate of 750,000 packet/sec and supports as many as 16,000 media access control (MAC) addresses. The module supports as many as 48 Ethernet or FDDI ports and will add Fast Ethernet connectivity by year-end. In addition, the module supports virtual LANs, integrated routing and policy-based management.

Bay's new Ethernet switch module — the 58000 — also operates at wire speed but supports only 8,192 MAC addresses. The module has a lower port density, with just 16 Ethernet ports and two Fast Ethernet

links. The card also has an expansion slot for eight additional Fast Ethernet ports and one FDDI connection. Pricing for the module starts at about \$700 per port.

Cabletron's SmartSwitch for Bay's System 5000 hub will cost about \$500 per port and will be available this summer.

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161 Worcester Road
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In-Site

Motorola

Continued from page 1

and scalability, as well as unsatisfactory customer support, prompted Motorola to make the switch.

"The number of router ports was increasing, yet the net performance was degrading," said Rick Armstrong, manager of networking and communications for three of Motorola's semiconductor groups here. "A router's performance is based on how large the routing tables are, and as the size and complexity of the net increased, so

"We've had real bad luck with Cisco routers," Armstrong said. "Seems like since they got into the switching business, the quality of their routers has gone down significantly to where we've had a tremendous amount of failures," Armstrong said.

Motorola deploys 80 Cisco AGS+, 7000 and 7500 routers as the backbone of a 7-year-old LAN internet linking three Austin-area campuses in a DS3 ring. T-1 lines fan out from the ring to 12 remote sites across the country, and 300 Ethernet and FDDI segments connect 9,000 nodes to the net.

Motorola uses the network for computer-aided semiconductor design applications, electronic mail and Network File System (NFS) file transfer. But NFS was not designed to be utilized in a large, routed environment, so latency problems can occur when trying to mount NFS files across nets.

NFS traffic is "choking the routers to death" by using 80% to 100% of their CPU cycles

all day, leaving virtually no processing power for other applications, he said. Router maintenance and administration is costly as well, Armstrong added.

"[Access control lists] and filters kill the routers," he said. "That's why I can't understand why Cisco wants to take their switches and put routing tables on them."

By moving to a switched backbone, Motorola can reduce latency by eliminating router hops; reduce administrative over-

head in setting up NFS clients and servers; and achieve finer granularity in security by assigning privileges via media access control addresses rather than IP subnet addresses.

So over the next three to five years, Motorola will replace about 60 of those Cisco routers with 30 to 40 Cabletron MMAC-Plus Ethernet and FDDI switches. Eventually, Motorola plans to upgrade the Cabletron switches to support an Asynchronous Transfer Mode WAN backbone with switched 100VG-AnyLAN pipes to each desktop.

Motorola has replaced two of three AGS+ routers with three MMAC-Plus switches at a cost of \$350,000 to meld 18 highly utilized, routed nets into two switched nets. The firm is installing about one MMAC-Plus a week.

"As those go in, the routers come out," Armstrong said. "When we're done we might have two routers left" for WAN access, security and subnetting.

But that also could change. Motorola will use MMAC-Plus IP routing modules until it deploys Cabletron's SecureFast Virtual Networking Services (VNS) software.

Ultimately, SecureFast VNS will handle network addressing, broadcast domain establishment, subnetting, firewalling and access security without the overhead associated with routers, Armstrong said.

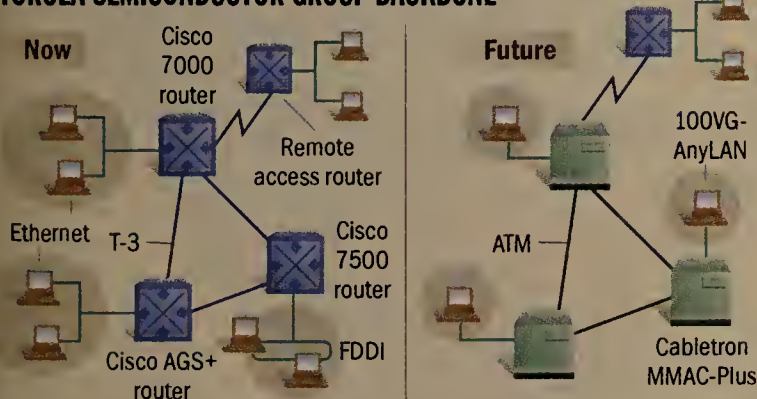
Already, Motorola has seen a 100% improvement in performance, increased worker productivity and lower maintenance costs in the divisions with the switches.

Cisco makes LAN switches, too. But Motorola opted for Cabletron due in part to product availability problems with Cisco.

"I've had a group waiting since October" for delivery of switched FDDI on Cisco's Catalyst 5000 switches, Armstrong said. "Finally, we just got fed up. Cabletron gave us 75 cents on the dollar" to trade in a Catalyst 5000 for an MMAC-Plus.

For the routers, Cabletron is offering Motorola 50 cents on the dollar. ■

MOTOROLA SEMICONDUCTOR GROUP BACKBONE



Motorola's Austin semiconductor group is changing the face of its network by replacing 60 to 80 Cisco AGS+, 7000 and 7500 backbone routers with Cabletron's MMAC-Plus switches. The switches will anchor an ATM and switched 100VG-AnyLAN network.

GRAPHIC BY TERRI MITCHELL

did the need to find an alternative."

Switching provides higher speed, lower latency data transmission than routers, which can exhaust much of their horsepower on routing table maintenance and packet examination. Switching enables Motorola to scale the network based on application requirements rather than platform constraints, Armstrong said.

But Armstrong has also become increasingly disillusioned with Cisco itself.

Fighting crime with IT: How safe do you want to be?

I am in the middle of reading a fascinating yet extremely disturbing book called *Mindhunter* by John Douglas with Mark Olshaker (Scribner, New York). This is the autobiography of FBI Special Agent Douglas, who developed many of the techniques for profiling serial killers. It is definitely a must read — if you can stomach some of the details.

Douglas is the man that inspired the character Jack Crawford in *Silence of the Lambs*. He is an expert at understanding how serial murderers are motivated, think and respond.

This book paints what I see as a truly horrifying picture of serial killers — people who are driven by nature or nurture to act in ways that are unthinkable and unspeakable. Serial killers are, according to the book, cunning and resourceful — and usually appear to be quite normal. Ugh.

What is so astounding to me is the difficulty of tracking, finding and identifying these people. This raises the question of how useful information technology (IT) is or could be in helping to catch these deviants. It seems from the book that the major use of computers in this area is only to search and sort data. Douglas actually notes in the book that the FBI has tried to create software that mimics the human deductive process in this field, but it hasn't worked that well.

But even though computers apparently haven't made much of an impact in anything other than a basic data processing role, there are many areas where IT could be applied.

For example, one of the major problems is that these crimes can be committed by people who are extremely mobile. (One case the book discusses is of two guys driving around in what can only be called a mobile torture chamber.) Is it conceivable that we might ever accept that vehicles need to be tracked at a detailed level?

Just consider how much easier it would be if the FBI could find which vehicles went through a given point at a given time. All it would require would be the mandatory mounting of a transponder in each vehicle and the installation of sen-

In an age where the unhinged can travel far, fast and anonymously, can we tolerate an assumed privacy in the face of real danger?

sors on roads.

Now, I know that many people will respond with the argument that the potential abuses of such a system might make such surveillance a real threat to civil liberties. After all, the FBI and the CIA have been known to abuse the rules from time-to-time. But if we assume that adequate safeguards can be put in place, we gain a profound tool for dealing with a very serious problem.

And while we're thinking about tracking things, how about children? Child abductions occur all the time. I remember reading about one in a large store in Los

Angeles where the abductor grabbed a little girl, drugged her, cut her hair and dressed her to look like a boy in just a few minutes. If they hadn't shut the shop quickly, the maniac would have gotten away.

So why isn't there some kind of tracking system for children? If there was a chip with a transponder that could be implanted subdermally — a kind of LoJack for kids — I'd have one on my child tomorrow. Child missing? Call the location center and they'll be able to get a fix in seconds.

I'm starting to think that some loss of privacy may be the price we have to pay to be safe. In an age where the unhinged can travel far, fast and anonymously, can we tolerate an assumed privacy in the face of a real danger?

Information technology is potentially the most powerful tool for fighting serious crime, but only if there is an information gathering framework in which it can operate.

Drop Gibbs your thoughts at mgibbs@gibbs.com or call (800) 622-1108, Ext. 504.



Mark Gibbs

Industry shift makes shows like Interop less relevant

Last week, I knelt on my lawn of Bermuda grass and noticed a few flecks of green poking through the dormant brown mat. Spring sneaks up on you here in the South. First you see a hint of green, then a burst of chlorophyll suddenly transforms the drab backdrop into a sea of rich color.

The network industry is in a similar state of transformation, and nothing shows this better than changes in the NetWorld+Interop conference and exhibition running this week in Las Vegas.

It is the networking industry's premier trade show. Changes in the show are evidence of a subtle shift in the nature of network technology and how it is sold and used.

The event started as the TCP/IP Interoperability Conference in 1986, when founder Dan Lynch lured 300 network pioneers to Monterey, Calif., for what he intended to be his personal job fair. But attendees ecstatically discovered Interop was a unique opportunity to trade ideas

eled off at 50,000 with 600 exhibitors.

Today's NetWorld+Interop is a different animal. Early shows sported booths with ponytailed engineers clad in blue jeans; technospeak ruled. Now marketing suits drive slick booths with professional models, skits and canned presentations. Lord help them if something breaks.

InteropNet is still there but barely shows up in NetWorld+Interop's marketing literature.

As for education, virtually all of NetWorld+Interop's conference sessions are now run by vendor executives. Four of the five keynote speakers are also vendor executives, unlike earlier shows that featured end users.

These changes are a natural outgrowth of the network industry's maturation. Networking poses fewer mysteries today than it did in the late '80s. Sure, there are technical challenges, but they affect a narrower range of people than during the early days. Marketing always holds sway as products commoditize and old challenges become maintenance drudgery.

Truth is, big technology trade shows are less important as information delivery vehicles.

Experienced network managers find that sophisticated trade publications and on-line resources, skilled consultants, vendor training programs and Web sites often obviate the need for time-consuming, expensive cross-country trips to battle crowds at huge trade shows.

Big shows like NetWorld+Interop also have trouble switching identities with the tide of popular interest. Intranets, the Internet and the World-Wide Web now pervade network publications. Yet the vast majority of new product announcements at NetWorld+Interop are for boxes that provide basic network connectivity. Network applications, despite the rhetoric, are hard to find at the show.

NetWorld+Interop and national trade shows like it have played a key role in teaching network managers technical skills. However, as the seasons of networking shift, as networking becomes more mainstream and even consumer-oriented, these venues are quickly becoming less relevant to doing your job.

Buerger is a network industry consultant and writer in Atlanta. He can be reached at dave@buerger.com.



Dave Buerger

Truth is, big technology trade shows are less important as information delivery vehicles.

about network technology. Lynch got his job — ringleader of a vibrant new industry. Interop moved to San Jose in 1988, where its exhibits drew 5,400 attendees and its conferences pulled in 1,800. A show innovation was InteropNet, which linked every exhibitor's booth and served as a proving ground for network product interoperability. The show's live network quickly became its hallmark.

Vendors loved the show. In 1989, an IBM vice president told Lynch, "This is great! You're building a new industry, and IBM needs this platform to show it is not a dead duck." Vendor schedules became driven by Interop show dates.

The event quickly hit the big time. Lynch sold it to Ziff-Davis in 1990, which sold the show in 1994 to Softbank Expos. Attendance peaked at 60,000 during the 1994 show in Las Vegas and has since lev-

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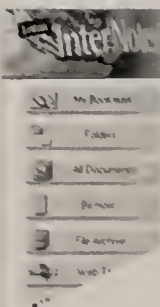


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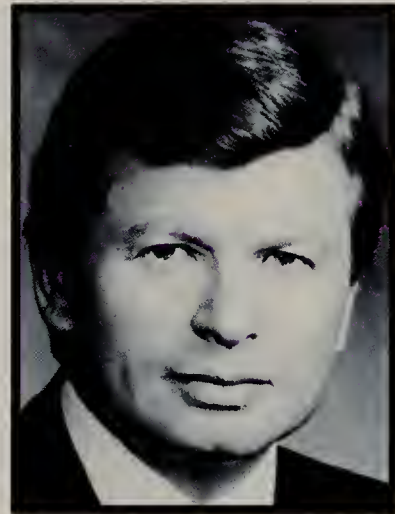


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